INTERROLL®

INSPIRED BY EFFICIENCY

User manual

Interroll Pallet Roller Flow FIFO

PF 1100

Version 3.0 (June 2013)
EN - Translated from French

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About this manual

Remarks concerning the use of this manual

Manual contents

This manual provides remarks and important information about the various operating phases of the Pallet Roller Flow:

- Transport, assembly and start-up
- Safe operation, maintenance, troubleshooting, waste disposal

Validity of this manual

This manual describes the Pallet Roller Flow as it is delivered by Interroll.

In the event of an installation involving non-standard containers or contents, specific recommendations, specific operations modes and all contractual documents are provided along with this manual.

This manual is an integral part of the product

- To ensure safe, reliable operation and to benefit from the guarantee, before using the Pallet Roller Flow you must follow the recommendations in this manual and the data in the order confirmation.
- Keep this manual near the Pallet Roller Flow.
- Give this manual to any operator or subsequent user of the Pallet Roller Flow.
- Interroll shall not be held responsible for damages or failures which may result from ignoring the recommendations in this manual.
- Contact Interroll Customer Service if you have any questions after reading this manual. The last page lists the details of the person to contact in your country.

Warnings in this document

The warnings in this document concern dangers which may arise while using the Pallet Roller Flow. For relevant warnings see *Safety, page 6*, and the warnings at the beginning of each chapter.

There are three categories of danger, indicated by the following key words:

- Danger
- Warning
- Caution

Key word	Meaning
Danger	Indicates a hazardous situation, which, if not avoided, may result in death or serious injury.
Warning	Indicates a hazardous situation, which, if not avoided, may result in death or serious injury.
Caution	Indicates a hazardous situation, which, if not avoided, may result in a minor or moderate injury.

Structure of warnings

Danger

Nature and source of hazard

Possible consequences of non-observance.

► Information about how to avoid the hazard.

Notice

This symbol identifies possible material damage.

► Information about how to avoid damage.

Additional symbols

This symbol displays safety instructions.

This symbol marks useful and important information.

► This symbol marks the steps that have to be carried out.

Safety

General safety instructions

The Pallet Roller Flow is designed according to the technical state of the art. However, certain risks may still arise.

- Risks of physical injury or death to the user or bystanders
- Damage caused to the Pallet Roller Flow or to other material

Disregarding the warnings in this manual may lead to serious injury or even death.

► Always read this manual carefully and make sure you follow the safety instructions.

► Only qualified and specially trained personnel may work with the Pallet Roller Flow .

► Always keep this manual at hand and make it accessible to all personnel.

► Always comply with the relevant national safety regulations in your company.

► Contact Interroll Customer Service if you have any questions after reading this manual. The last page lists the details of the person to contact in your country.

Intended use

The Pallet Roller Flow is reserved exclusively for industrial use in suitable environments. The installed lanes are intended for dynamic (gravity-based) storage only of foreseen and previously approved isolated loads. They are reserved exclusively for storing referenced or standardised containers.

Any other use is considered inappropriate.

The installation configurations must be applied. They are defined in the order confirmation and in this manual. All other changes concerning the components and their location in the lane are not authorised.

To load and unload containers in the lanes, a suitable forklift must be used. This forklift must meet all the following functions:

- inclinable upright or forks or not according to the provisions in the order confirmation
- upright height adapted to the rack height

Comply with the maximum loads recommended by the rack manufacturer and indicated on the load plate. The content must not exceed the maximum load specified by the container supplier or by the standards.

Unintended use

The Pallet Roller Flow may not be used to transport people, bulk products, or small parts.

Applications which do not comply with the planned use of the Pallet Roller Flow require prior written approval from Interroll.

Qualified personnel

Qualified personnel are persons who read and understand this manual, and taking national regulations into account, can completely execute incidental work.

Only qualified and trained personnel may work with the Pallet Roller Flow taking the following into account :

- The relevant manuals and diagrams
- The warnings and safety instructions in this manual
- The system specific regulations and requirements, *see "Assembly and installation", page 12*
- National or local regulations and requirements for safety and accident prevention

Risks

The following list informs you about the various types of dangers or damage that may occur when installing or working with the Pallet Roller Flow.

Personal injury

- ► The equipment may be used by qualified personnel only, in any of its operations modes.
- ► Comply with the technical data provided in the order confirmation.
- ► Follow the assembly and operating instructions.
- ► Use suitable forklifts only.
- ► Check the installation and perform maintenance on a regular basis.
- ► Make sure that no one walks or stands underneath loads, or in the loading or unloading zones of the dynamic storage lane. Take all necessary precautions to prevent the presence of personnel within the lanes.
- ► Make sure that the loading / unloading rows include sufficient lighting so as not to hinder handling operations.

Risk of injury : do not walk on the side profiles of the modules, or on the rollers without using a safety harness.

Rotating parts

- ► Wear suitable work clothes and Personal Protection Equipment (safety shoes, gloves, etc.)
- ► Tie up long hair or wear a cap.
- ► Remove jewellery such as necklaces or bracelets.
- ► Do not walk on the rollers.
- ► Only maintenance personnel is authorised to enter the lanes, and only in compliance with current safety standards.

Product information

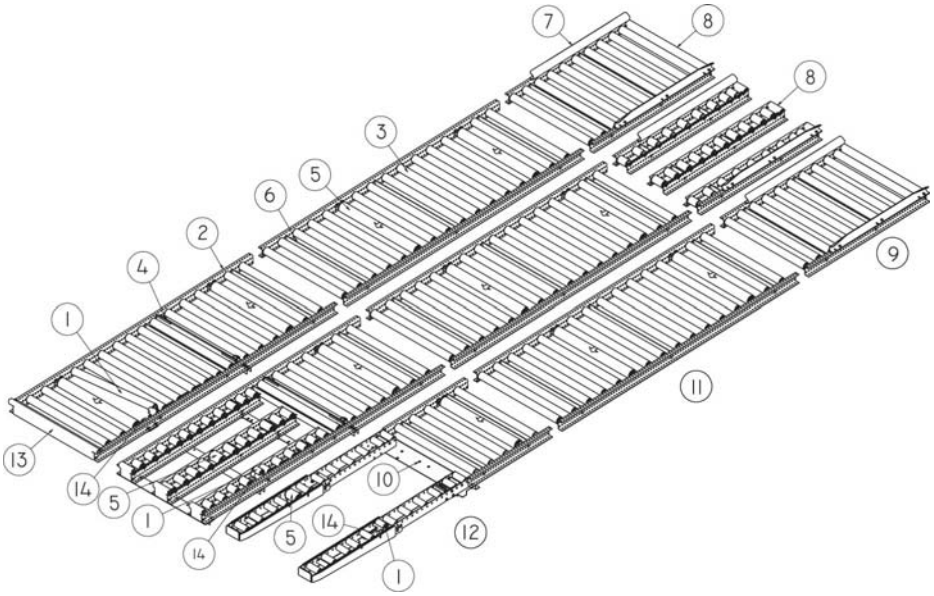
Product description

The Pallet Roller Flow is a dynamic storage system for heavy loads. It ensures the controlled descent of pallets.

Speed controllers control the descent of loads at a constant speed.

On the unloading site, the **separator** isolates the pallet from the pressure of the accumulated line of pallets.

Components

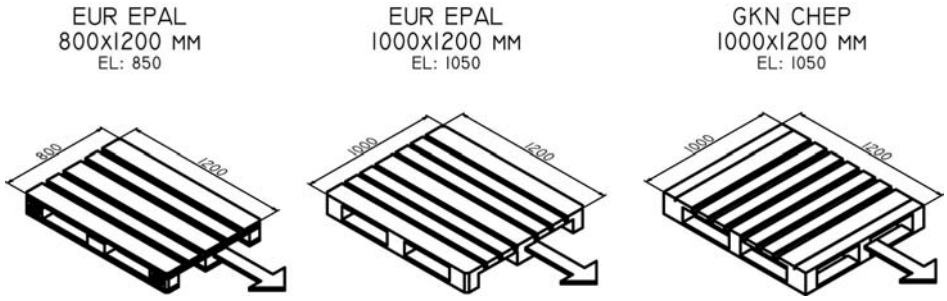


(1) Separator flap
(2) Side profile
(3) Handling rollers
(4) Separator stop
(5) Speed controller
(6) Cross-tie
(7) Pallet guide
(8) Loading plate
(9) Loading module
(10) Module riser
(11) Intermediate module
(12) Unloading module
(13) Lane end stop
(14) "Time plus" retarder

Technical characteristics of the Pallet Roller Flow FIFO

Gravity-based system

Load	60 to 1250 kg per pallet
Regulated speed	0.3 m/sec from 60 to 1250 kg
Maximum instantaneous speed	0.6m/sec from loading to separation
Maximum deceleration	1 m/sec.^{2}
Slope	Specified in the order confirmation Generally recommended slope: 4 %
Types of pallets handled by the Interroll system	• Standardised EUR EPAL pallet 800 mm x 1200 mm (W X D), see "Intended use", page 6 • Standardised EUR EPAL pallet 1000 mm x 1200 mm (W X D) • Standardised GKN CHEP pallet 1000 mm x 1200 mm (W X D) • Other containers: please contact Interroll.



Forklifts	Specified in the order confirmation

Atmospheric conditions

Ambient temperature	during operation	-30 °C to +40 °C
	during assembly	-30 °C to +40 °C
	for transportation and storage	- 30 °C to +80 °C
Humidity		Up to max. 90%, without condensation

Environment	The Pallet Roller Flow is not suitable for use in an environment presenting the following risks: • Oxidisation (either atmospheric or via chemical attacks) • Projection • Decomposition • Vibration • Explosion • Radioactive radiation • Electromagnetic radiation Exceptions are possible: please contact Interroll.

Load contents

The contents of the loads and their containers must not:

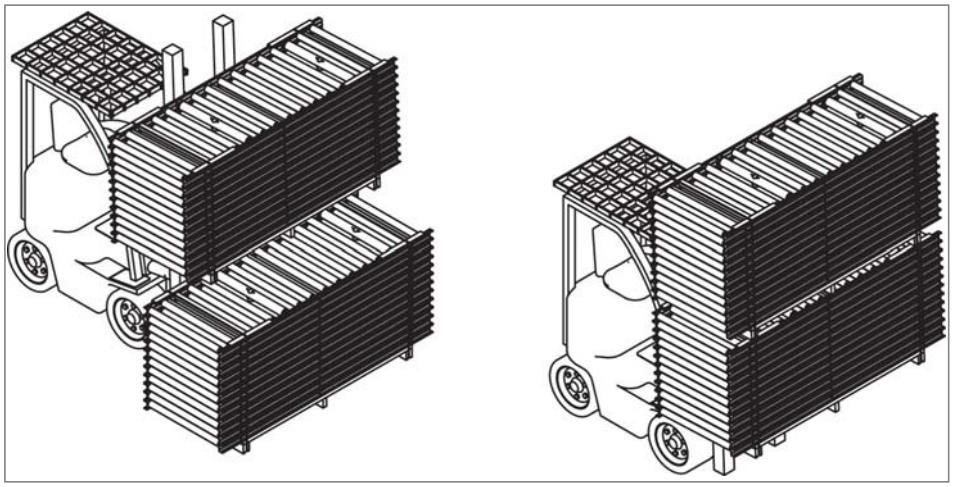
- Oxidise
- Corrode
- Decompose
- Block the lane's components
- Pollute steel or plastic components
- Prevent correct operation of any mechanisms

The Pallet Roller Flow must not be used in direct contact with food products.

Transportation and storage

Transportation

- ► Only qualified and authorised personnel should transport the equipment.
- ► Use slings or appropriate lifting equipment to transport the equipment.
- ► If the content is unstable, unload the container unit by unit and not by truck.
- ► The weight of each pallet is indicated on it. If using a forklift with a different lifting capacity, handle the module pallets one by one.



Storage

- ► Store equipment indoors.
- ► Never store the equipment outdoors, or in a dusty or humid environment.
- ► Respect the ambient conditions, *see "Technical characteristics of the Pallet Roller Flow FIFO", page 9*.
- ► Do not add additional loads to the pallets and boxes containing the Pallet Roller Flow and its components.

Assembly and installation

Warnings concerning assembly

Warning

Risk of injury in case of incorrect assembly

- ► As the Pallet Roller Flow is the subsystem of the overall installation, you need to perform a risk analysis of the entire installation.
- ► Identify the protective measures required concerning risks related to the local conditions at the site and to usage.
- ► Define a safety zone in the working area.
- ► Secure the zone and set up proper signalling and appropriate protection.
- ► For assembling modules on the rack, refer to the safety rules concerning working at height.
- ► Never climb on the rollers nor on the lane profiles without a safety harness.
- ► During assembly, wear appropriate Personal Protective Equipment (gloves, safety shoes, safety harness, helmet, etc.).

Assembly rules

There are several methods for assembling the Pallet Roller Flow. Adapt the assembly method provided by Interroll according to the national and local safety rules and requirements in the installation country. Some companies may require the use of a boom lift for work at a height.

The dynamic storage lanes are subsystems of the overall installation. They are delivered in compliance with the technical data indicated in the order confirmation.

The delivery of Pallet Roller Flow lanes comprises pre-assembled roller chassis and accessories. These components must be assembled, installed and positioned on a rack or on module risers.

If any changes are made to the components or their location in the lanes, then Interroll is no longer responsible for the installation, as this represents unintended use of the Pallet Roller Flow.

The racks must be assembled at the same time as roller modules are inserted on the beams. The racks must be attached to the floor to provide rigidity to the entire system.

Qualified personnel

The assembly and installation must be carried out by qualified personnel in compliance with the instructions concerning assembly and installation, and with safety instructions,

The manager of the team responsible for assembling the lanes must be technically competent and trained concerning the following:

- The products and their use
- The dangers inherent in the assembly of heavy or cumbersome components in high places.
- The risks related to incorrect assembly
- Uncontrolled speeds or propulsion of loads stored on the lane may may cause serious accidents.
- The adjustments required for correct operation of the lanes.

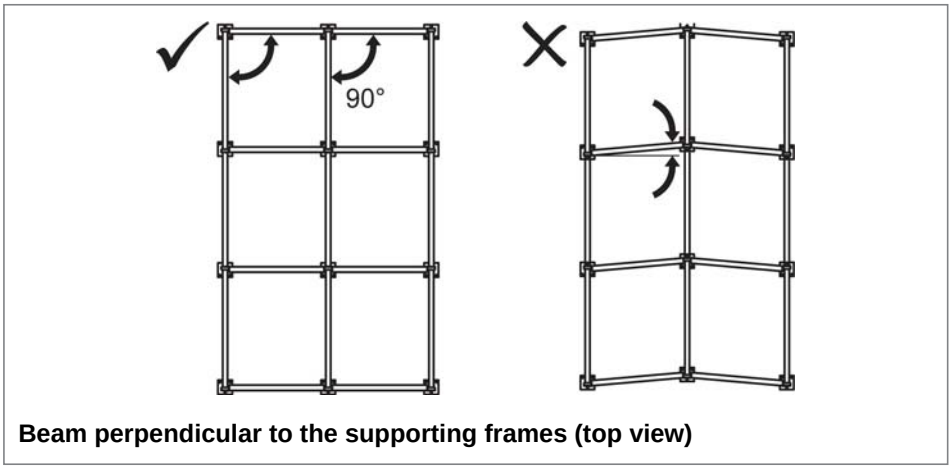
Interroll can provide dedicated training on the Pallet Roller Flow. We will send a quote on request.

General rules

► Comply with the rack specifications.
► If other systems interface with the Pallet Roller Flow, use the same reference point as the other systems to level the frames.
► Check the stability of the modules on the containers before cutting the bands.
► Recommended torque for modules on connecting plates: 45 Nm.
► Always start assembly from the loading site.
► Make sure you do not damage the modules nor the other components during assembly. Pay particular attention to the speed controllers, the separator and the end stop.
► It is recommended to install a floor stop in front of both the loading and unloading sides. The stop is used to halt the forklift and thus prevent any contact with the rack.
► Contact Interroll before attaching or hanging any equipment (such as sprinklers) in the area surrounding the dynamic storage installation.
► Clean the work site at the end of the installation. Do not leave components or tools in the installation area or its surroundings.
► Test the lanes before use.

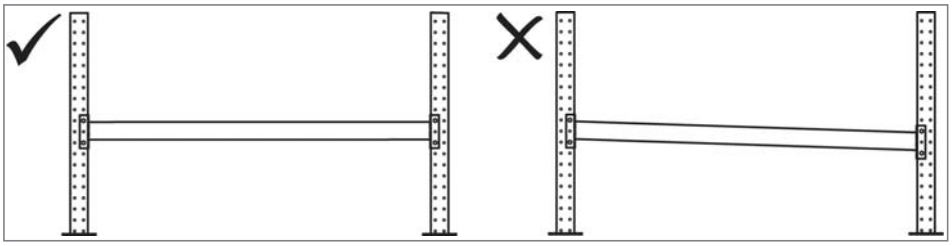
Rack assembly

The rack must be attached to the floor according to the rack manufacturer's specifications.
The module risers, provided by Interroll, must be attached according to the floor specifications.
The beams must be perpendicular to the supporting frames.

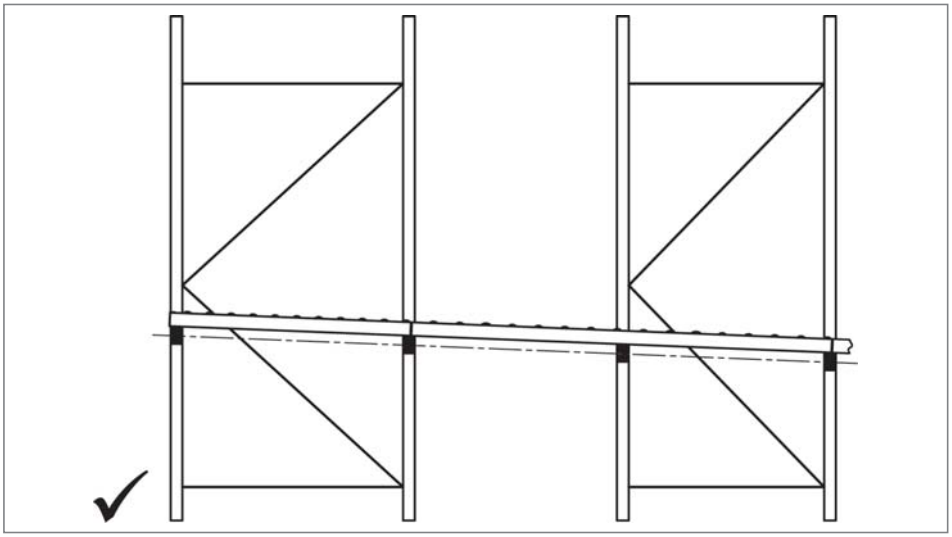


Beam perpendicular to the supporting frames (top view)

The beams must be horizontal.



The beams must be aligned and must have a constant slope from loading to unloading. The slope matches the slope of the lane.



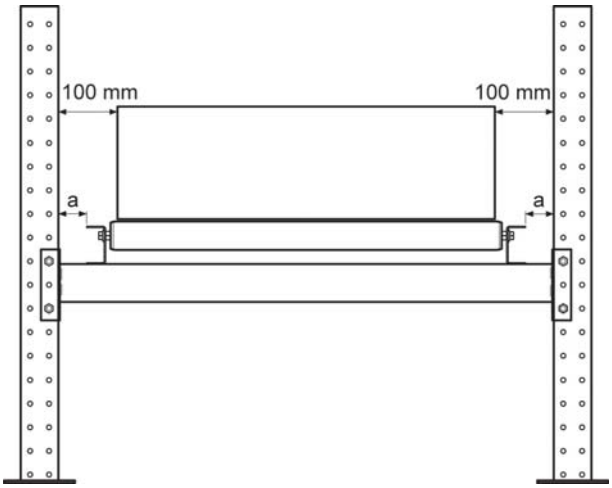
Adjusting the slope

- ► The roller modules are installed with a slope of 4% unless indicated in the master diagram.
- ► Ensure each type of beam is correctly located according to the overall rack diagram.

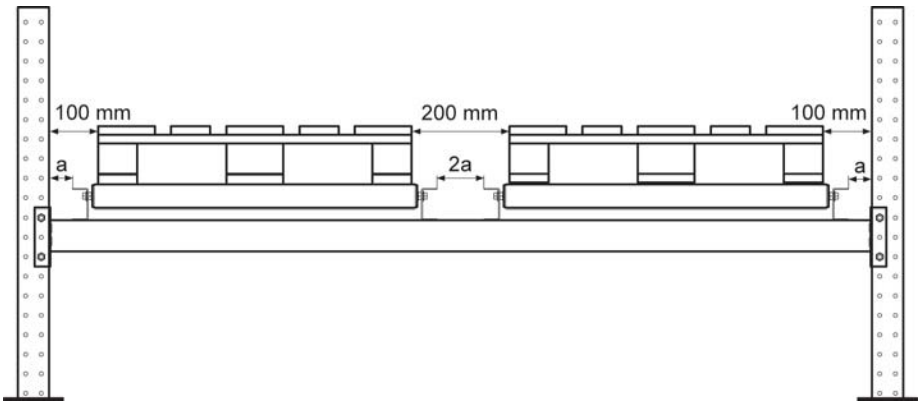
Positioning the module on the rack

The space between the lane and the rack upright must be uniformly spread. A minimum value of 35 mm is recommended.

A minimum space of 100 mm is recommended between the container and the rack upright.



Single lane
a : The space between the lane and the rack upright: min. 35 mm



Dual lane
a : The space between the lane and the rack upright (a) is half the distance (2a) between the lanes

Lane assembly

Identifying the components

The attached diagrams show the composition of the Pallet Roller Flow lane. The diagrams are included in an envelope inside the spare parts box.

- ► Identify each component by referring to the diagrams. This is especially important when you must assemble different types of lanes.
- ► Check that all the parts required and indicated for the assembly are available. If anything is missing, you must inform Interroll within 8 days.

Checking the rack

- ► Check that the rack is installed according to instructions, *see "Rack assembly", page 14*.
- ► Pay particular attention to the alignment and the slope of the beams.

Step 1 - Assembly of the test bay

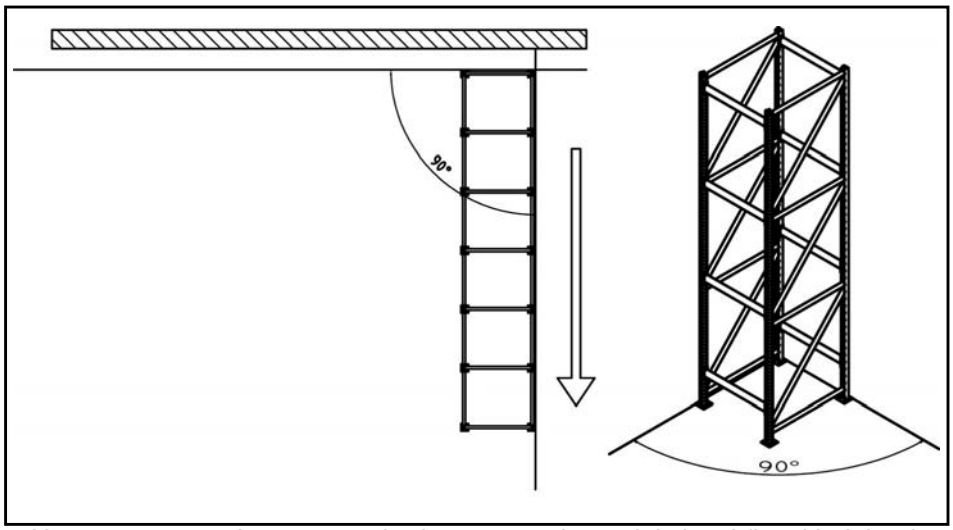
Before proceeding with assembly of the complete installation, a test bay must be assembled to ensure the correct operation of the system.

- ► Start by defining the location of the dynamic storage block by referring to the master diagram.
- ► If necessary, remove the module pallets from the assembly area.
- ► Sweep the zone and secure the work area.
- ► Mark on the floor the grid which will enable you to position each of the frame uprights.
- ► Using a laser or site laser level, define the aligning heights for each frame upright.

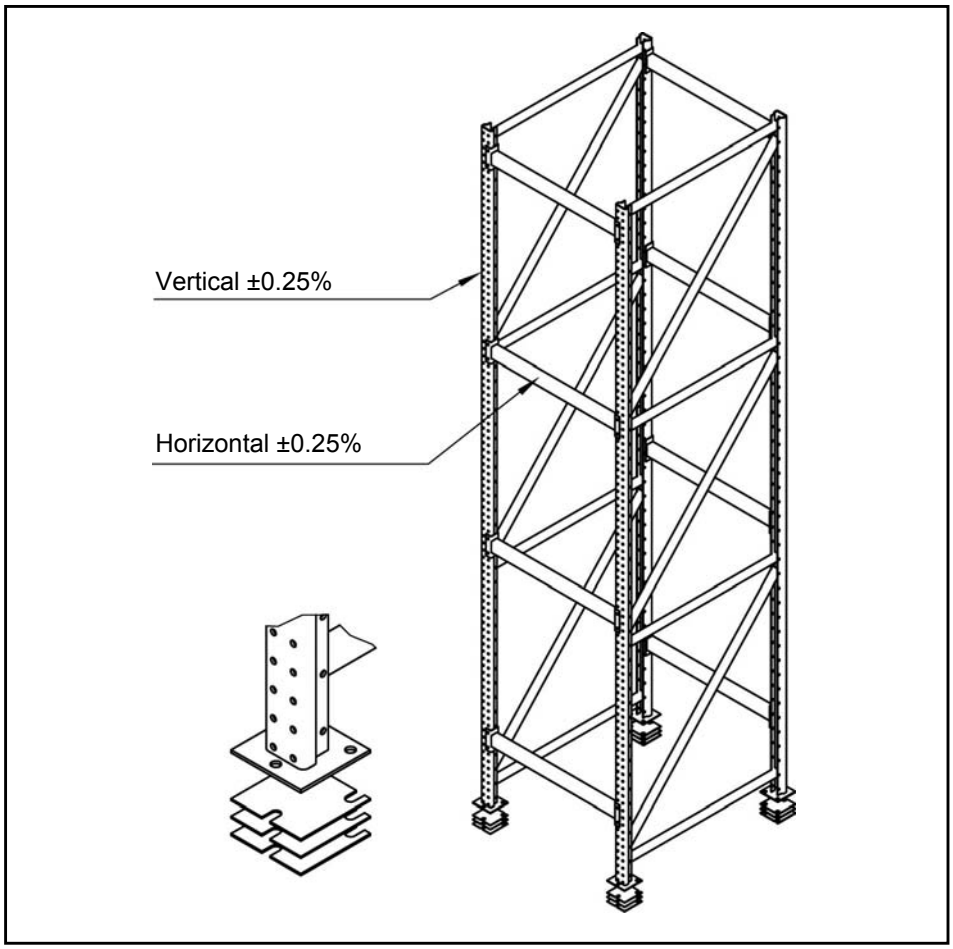
The rack uprights must all be level to ensure correct system operations. In the event of incorrect rack installation, Interroll shall not be held responsible for any operating malfunctions.

Rack

► Start by installing the front row of frames, on the loading side. Align the rack according to the floor markings on the front and sides



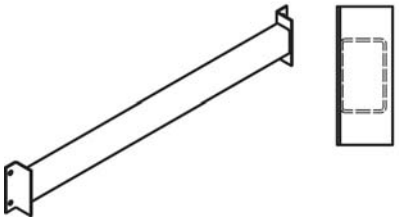
► Use as many wedges as required to ensure the rack is level (level height obtained by laser or site laser level). The beams must be horizontal and the uprights vertical.



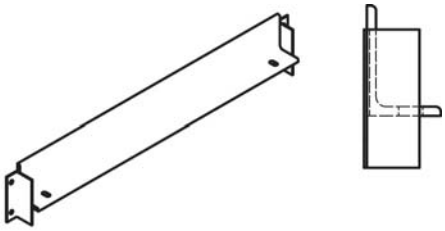
► Position the beams along the row of frames according to the master diagram provided by the rack manufacturer.

Ensure you use the correct beam type on the loading side (tubular beam o angle beam)

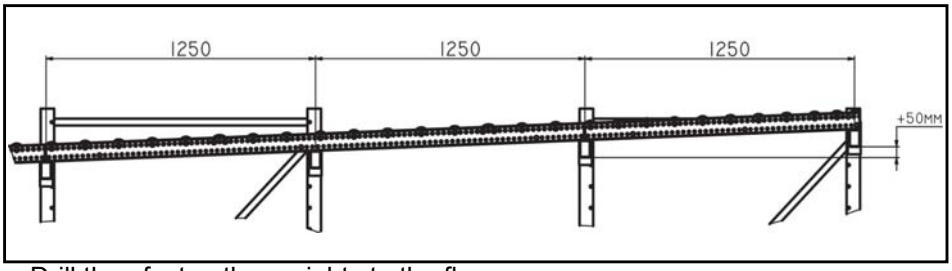
Tubular beam



Angle beam



The beams must be aligned and must have a constant slope from loading to unloading. The slope matches the slope of the lane (4% = rise of 50 mm every 1250 mm).

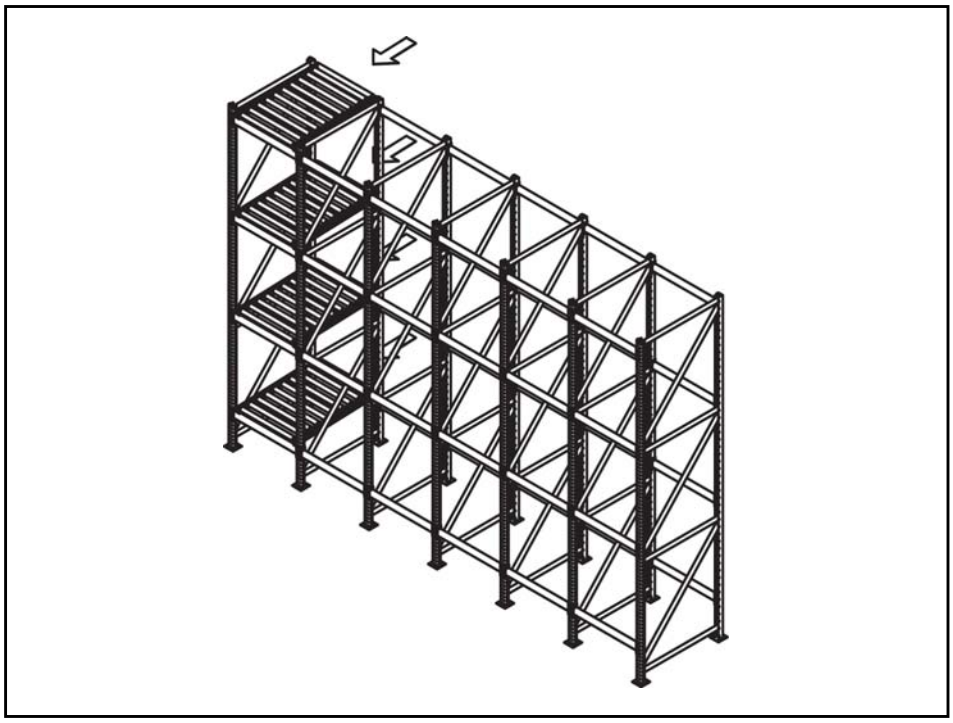


► Drill then fasten the uprights to the floor.

Loading modules

For installation of the Pallet Roller Flow lanes, see the assembly diagram in the appendix.

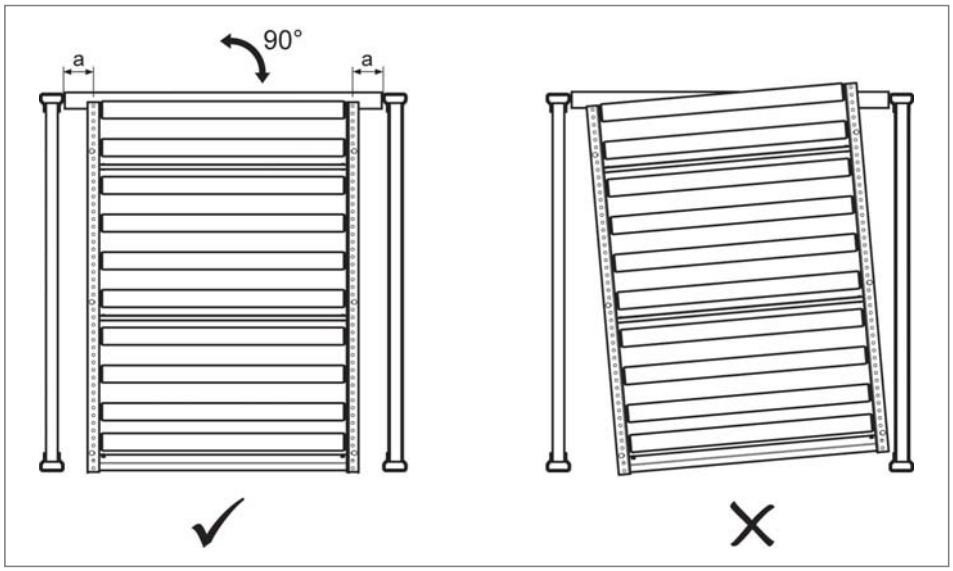
► On the loading side, insert all the loading modules for the test bay on the rack.



Align and attaching the first module

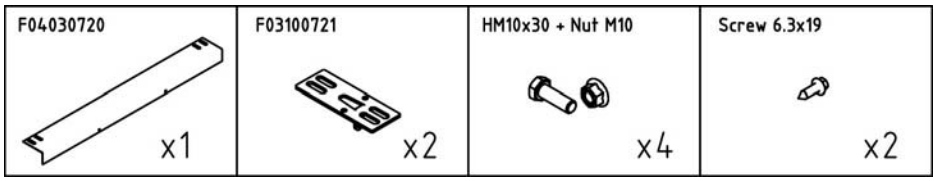
► Align the first module on the loading side in relation to the pallet descent axis.

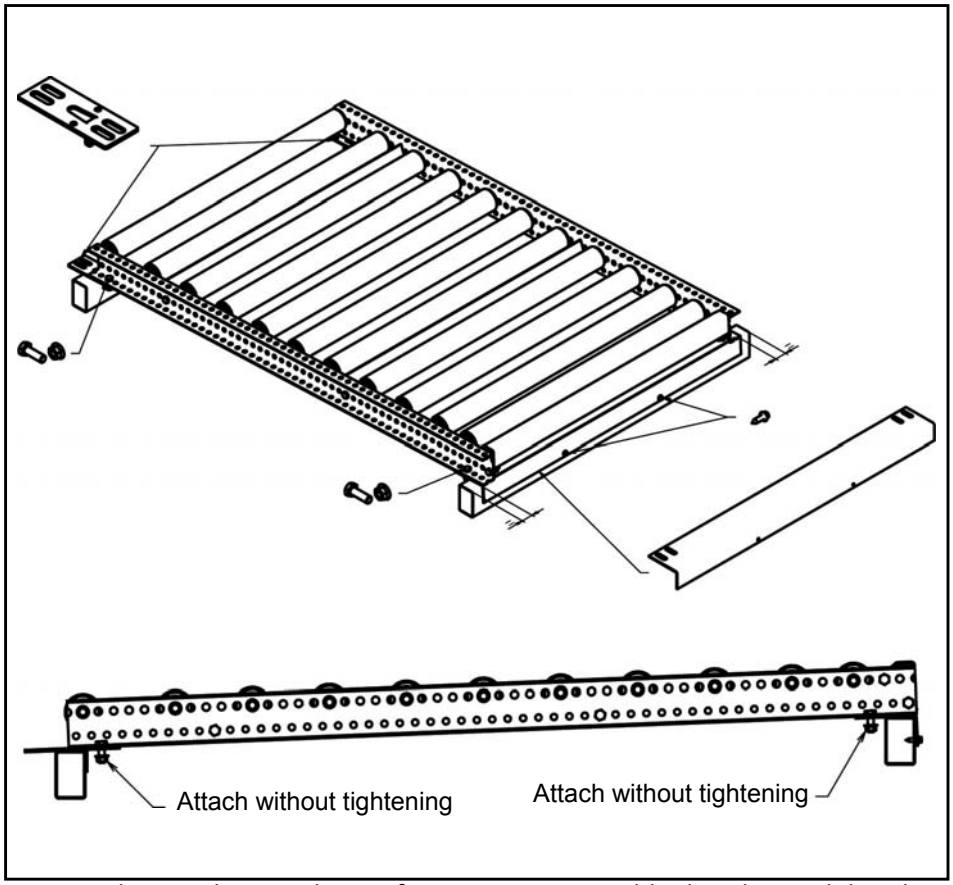
► Check that both distances (a) between the rack uprights and the profiles are equal.



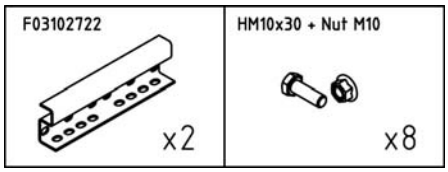
Tubular beam - traverse roller loading module (TR)

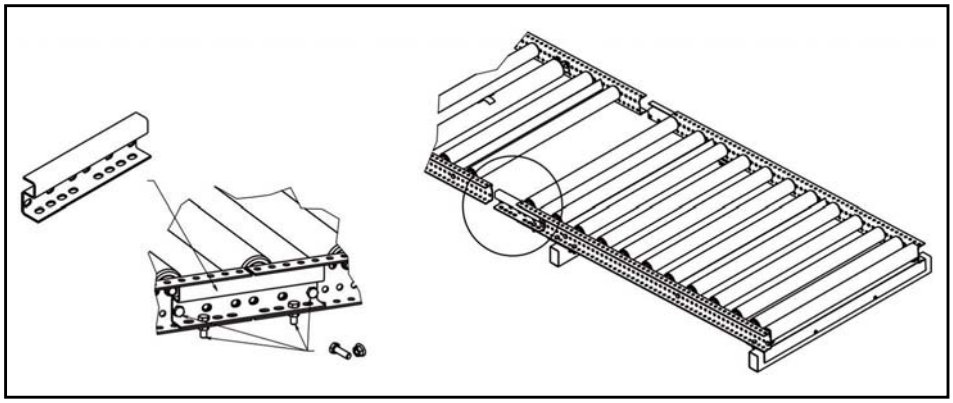
► Centre the fixing bracket on the beam then attach the bracket with 2 drill screws.





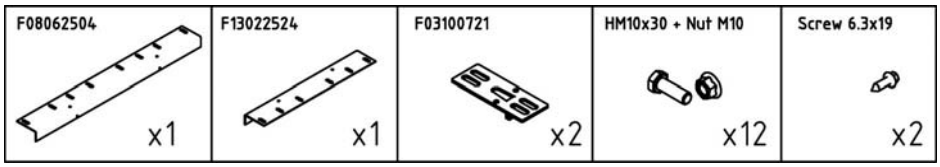
► Depending on the corridor configuration, it is possible that the module splice plates are to be used for the entire corridor at each module connection.

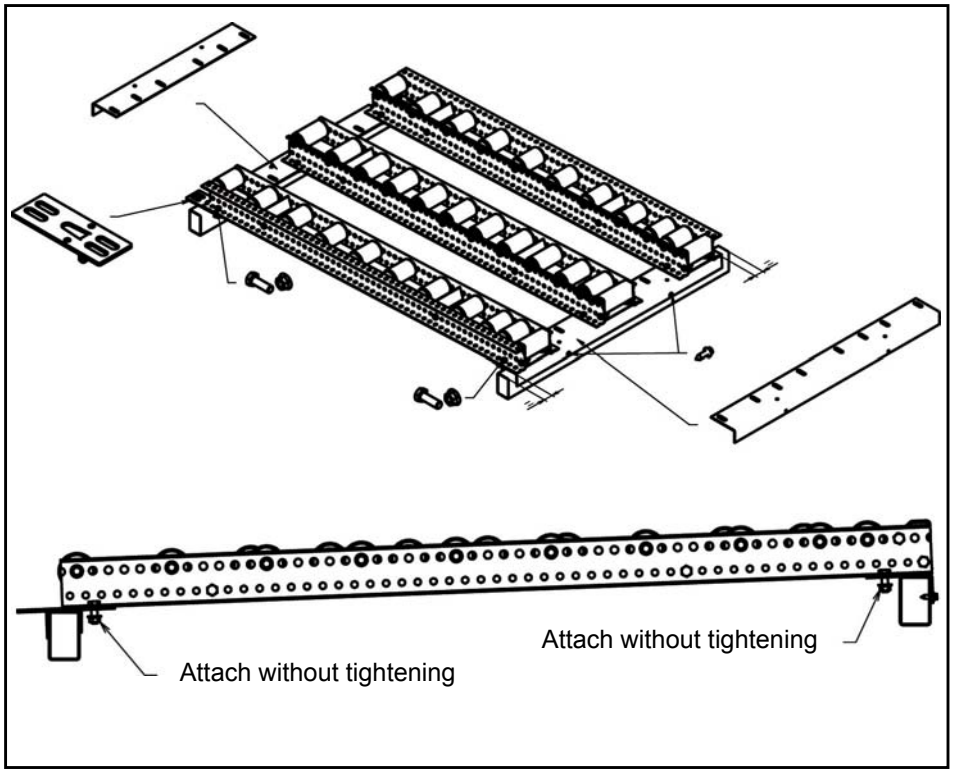




Tubular beam - 3 track loading (3TL) module

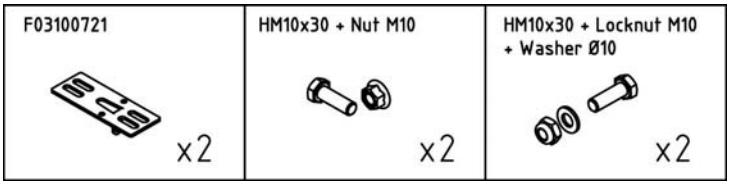
► Centre the 3TL fixing bracket (8 oblong holes) on the beam then attach the bracket with 2 drill screws. The space between the tracks is determined by this bracket.

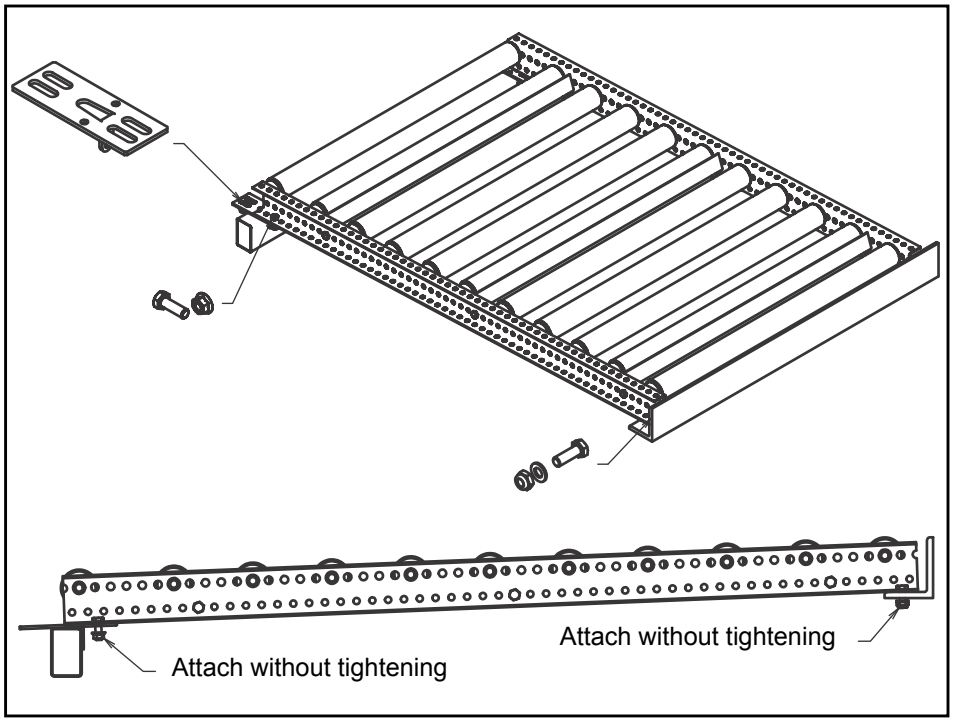




Angle beam - traverse roller loading module (TR)

The holes in the angle beam allow the loading module to be centred automatically.

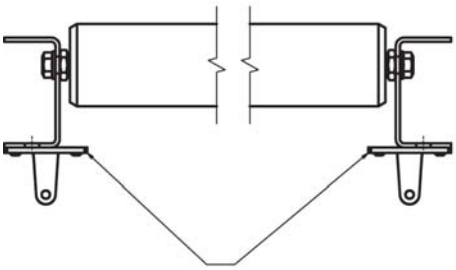




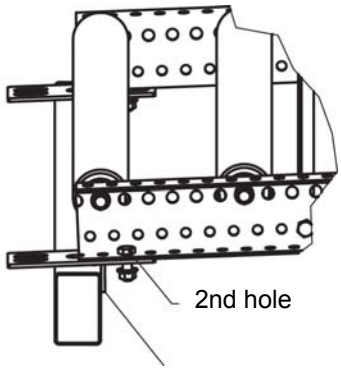
Notice

The PLJ connecting plates are assembled as follows:

- ► The PLJ connecting plates must not exceed the width of the modules. The PLJ connecting plate excess is between the profiles (under the rollers).
- ► The mounting bracket for the PLJ connecting plate must be on the loading side.
- ► The screw fixing the profile to the PLJ connecting plate is inserted into the second hole of the profile, with the screw head at the top (recommended torque 45 Nm).



PLJ connecting plates overhang to the interior of the module



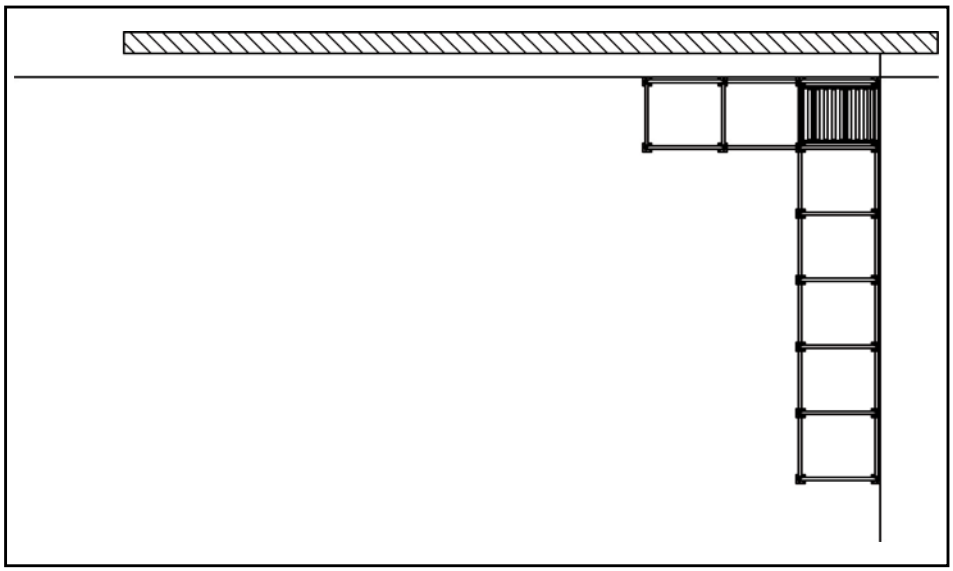
Mounting bracket for the PLJ connecting plate loading side

Reminder

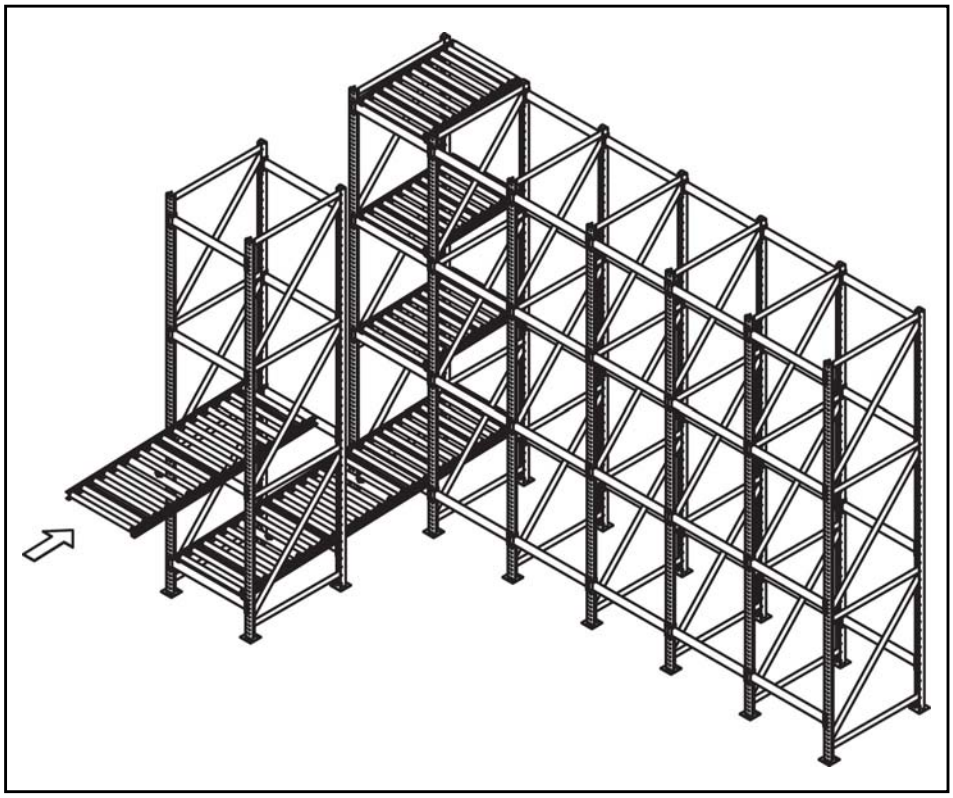
- Do not attach (with drill screws) the PLJ connecting plates onto the beams for the moment.
- Do not tighten the screws between the profile and the PLJ connecting plate. The oblong holes allow you to adjust the position of the modules when aligning the lanes.

Intermediate modules

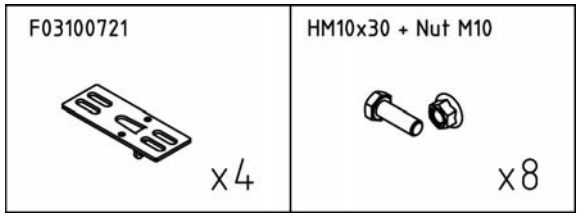
► Attach the following frames according to the floor markings.

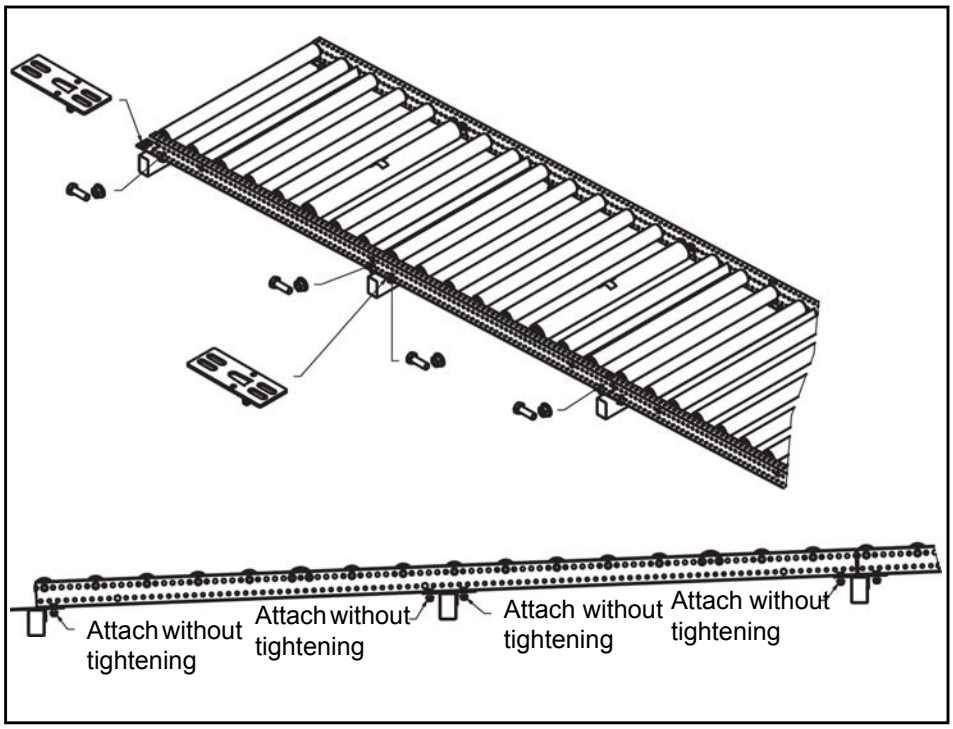


► Next insert the intermediate modules to all levels of the test bay. Load the modules from the front (unloading side). Install the modules from bottom to top.



Installing the long intermediate modules.

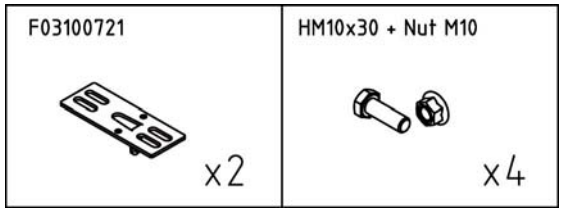


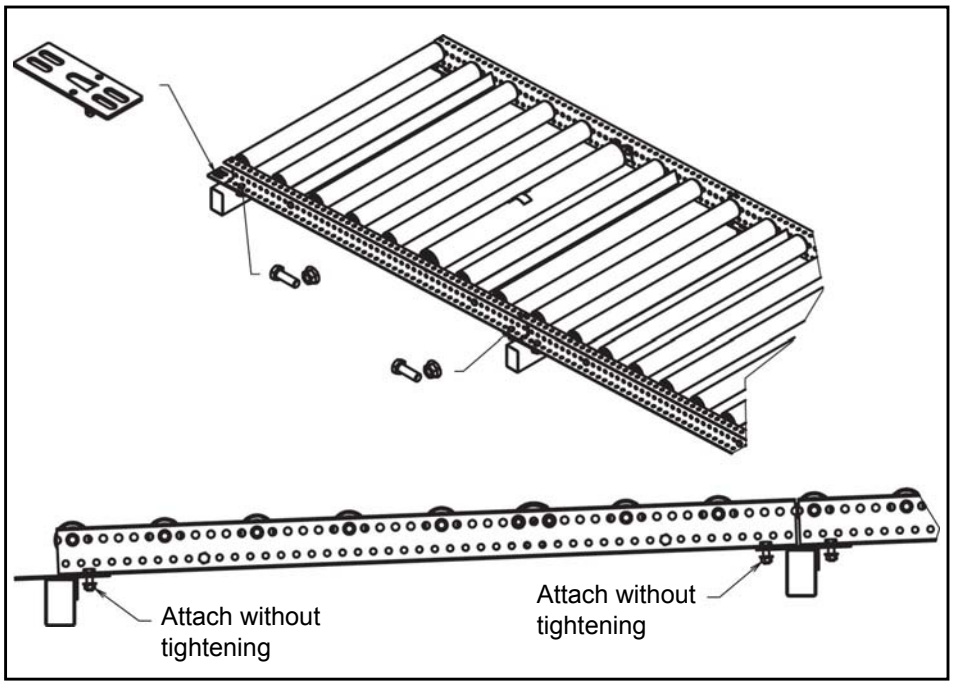


Reminder

- Do not attach (with drill screws) the PLJ connecting plates onto the beams for the moment.
- Do not tighten the screws between the profile and the PLJ connecting plate. The oblong holes allow you to adjust the position of the modules when aligning the lanes.

Installing the short intermediate modules.



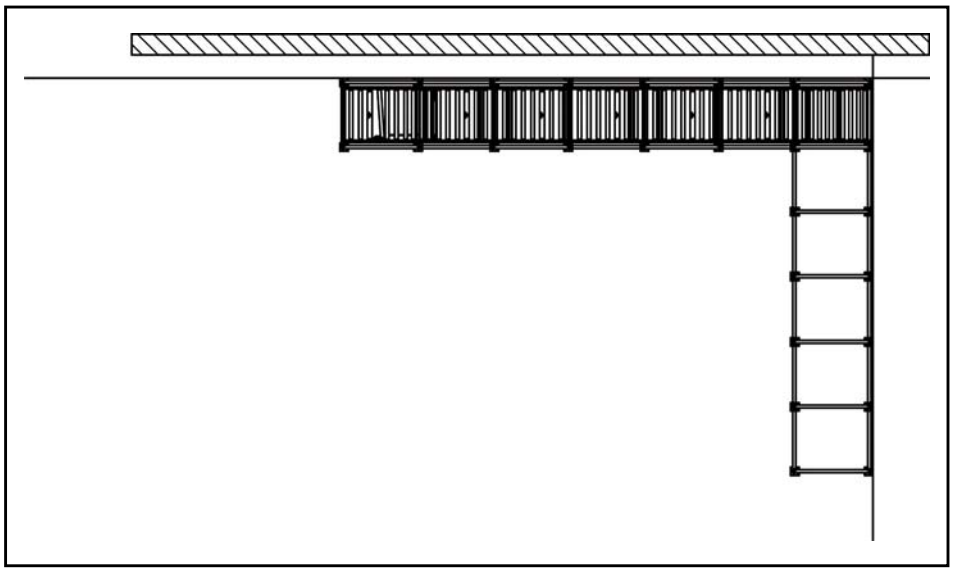


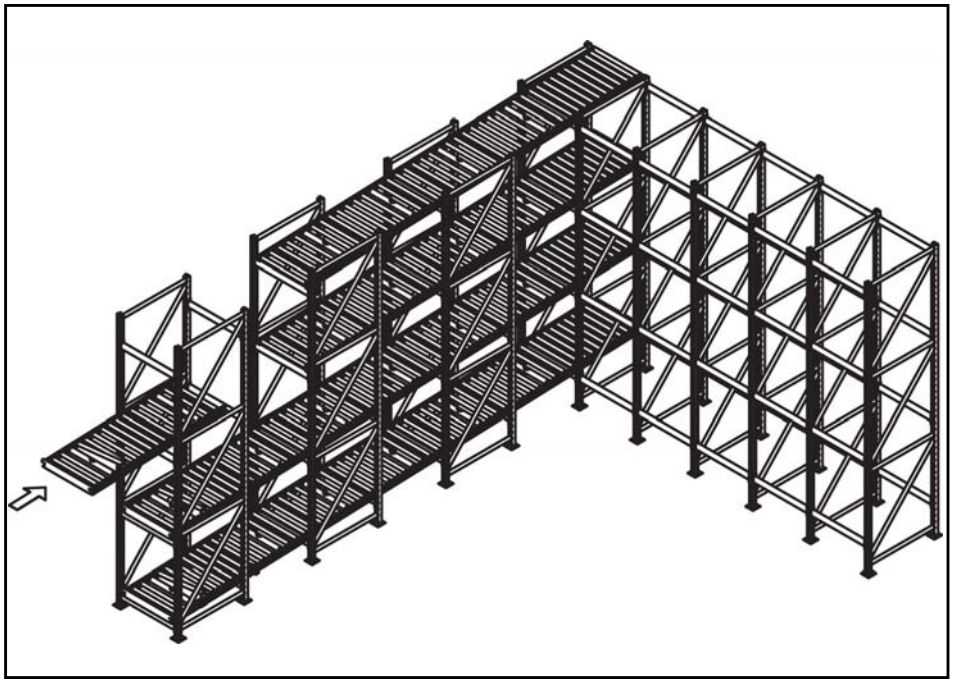
Reminder

- Do not attach (with drill screws) the PLJ connecting plates onto the beams for the moment.
- Do not tighten the screws between the profile and the PLJ connecting plate. The oblong holes allow you to adjust the position of the modules when aligning the lanes.

Unloading modules

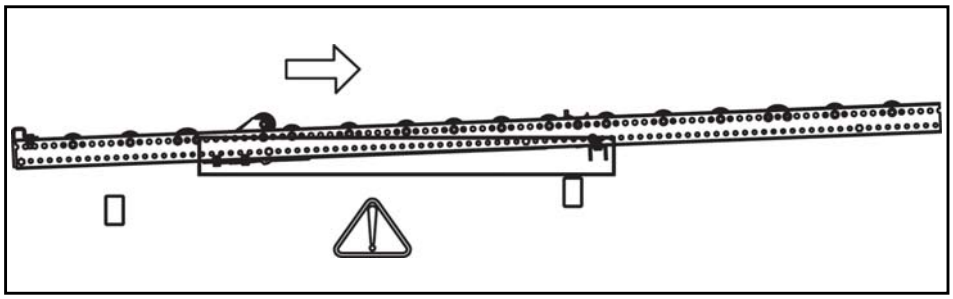
► On the unloading side, insert all the unloading modules for the test bay on the rack.



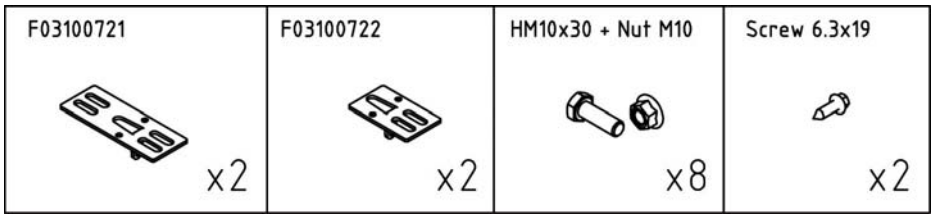


Avoid impacts on the safety elements of the separator

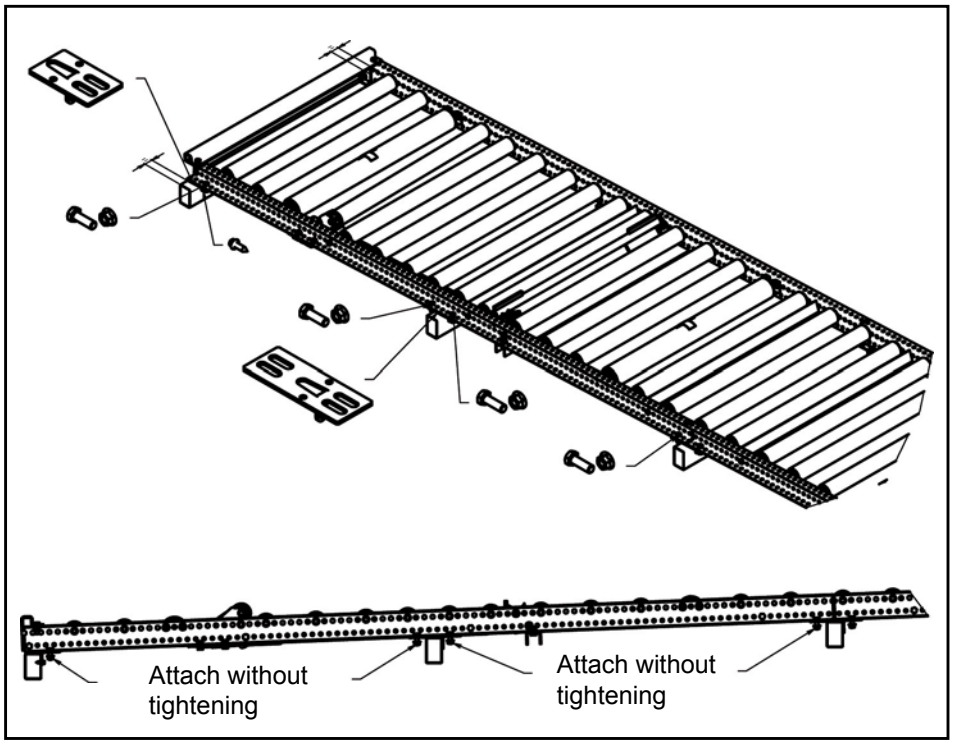
When inserting the unloading modules in the rack, ensure that the parts located in the frame below (Time Plus, separator flap, rod and separator stop) do not hit the forks of the forklift or the rack beams. Damage to these safety elements could cause operating problems in the lane.



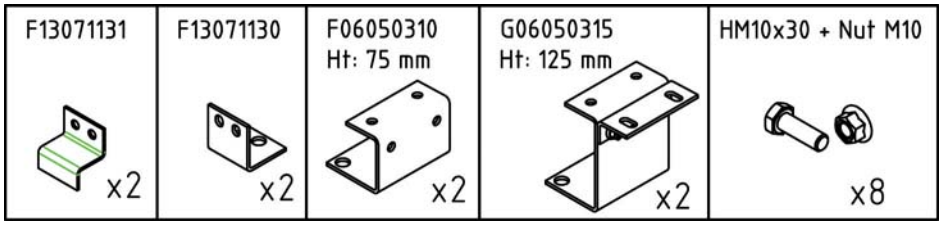
Tubular beam - traverse roller unloading module (TR)



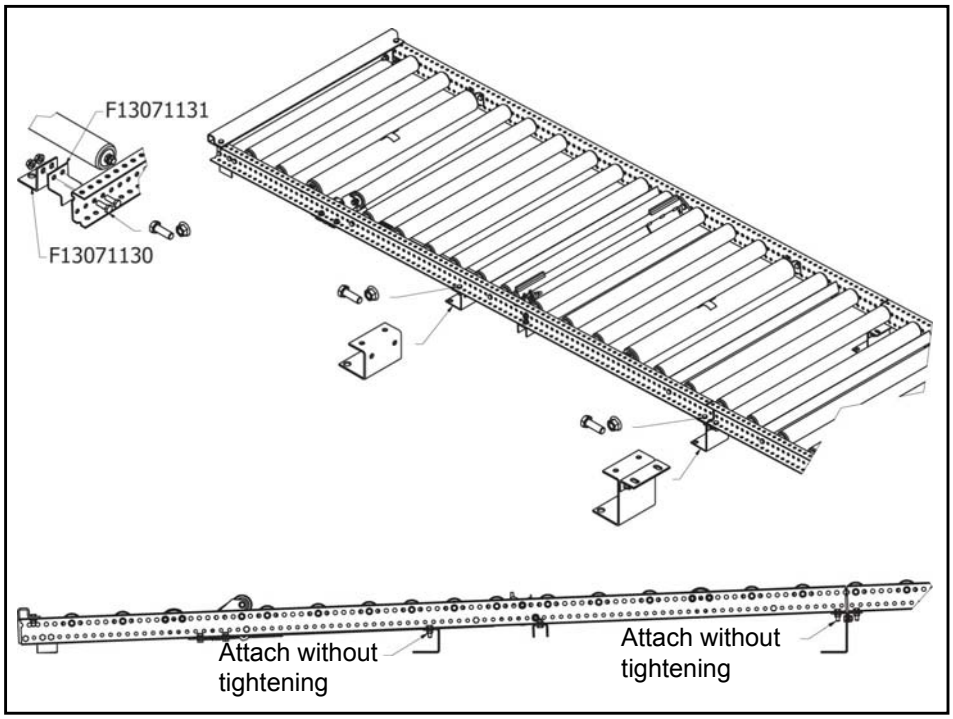
► Centre the module on the beam then attach the 2 short PLJ connecting plates with 2 drill screws.



Floor unloading - traverse roller unloading module (TR)



► Centre the unloading module between the frame uprights.



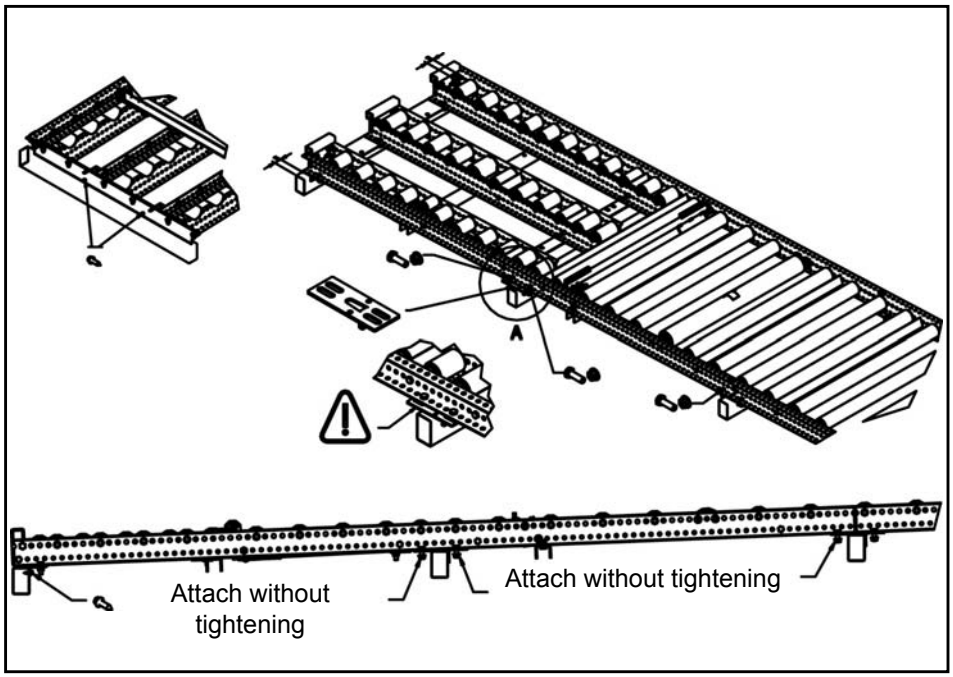
The floor mounting feet must all be level to ensure correct system operations. Adjust the feet if necessary to maintain a slope of 4%.

Refer to the assembly diagrams provided in the appendix for details of lane assembly on floor mounting feet.

Tubular beam - 3 track unloading (3TL) module

F03100721	HM10x30 + Nut M10	Screw 6.3x19
x2	x6	x2

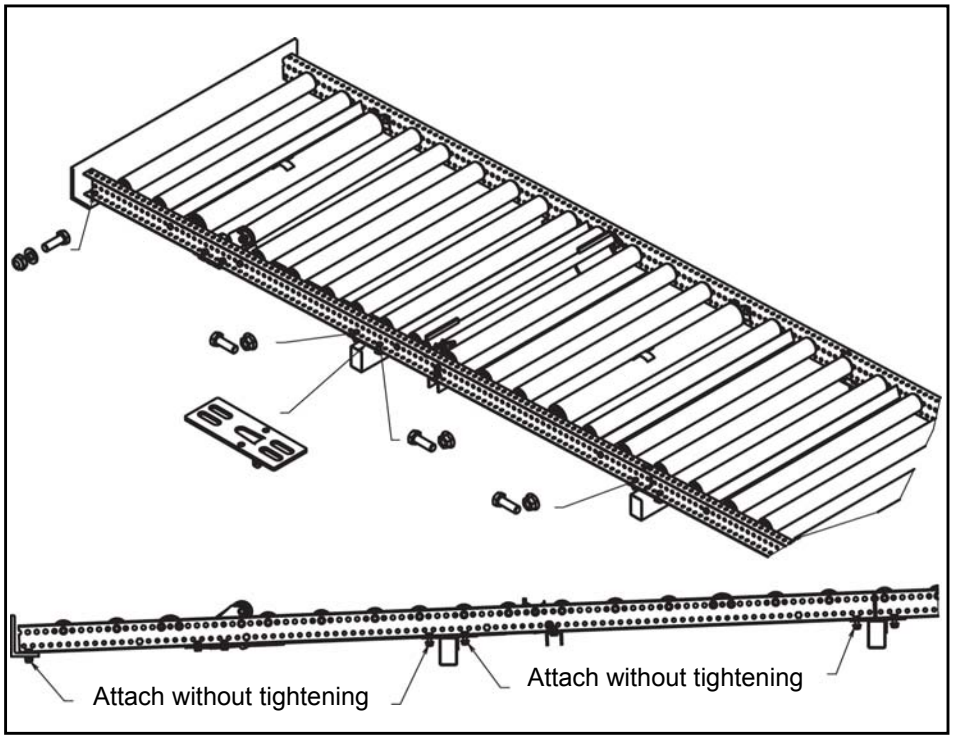
► Centre the module on the frame, then attach the fixing bracket at the end of the lane onto the unloading beam with 2 drill screws.



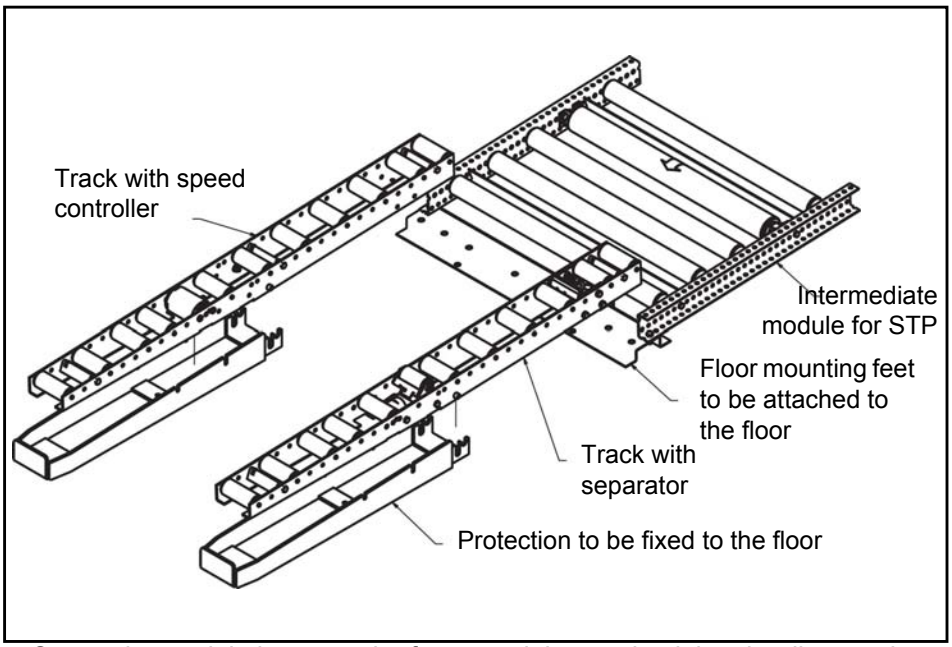
Angle beam - traverse roller unloading module (TR)

The holes in the angle beam allow the unloading module to be centred automatically.

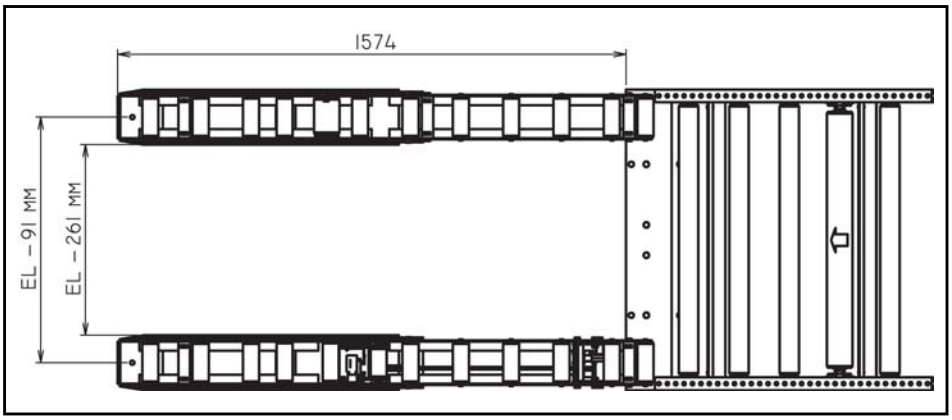
F03100721	HM10x30 + Nut M10	HM10x30 + Locknut M10 + Washer Ø10
x2	x6	x2



Floor unloading - unloading module STP (pallet truck)


Track with speed controller
Intermediate module for STP
Floor mounting feet to be attached to the floor
Track with separator
Protection to be fixed to the floor

► Centre the module between the frame uprights, maintaining the distance between the 2 unloading tracks. If the lane is installed on risers (without a rack), refer to the floor markings to define the alignment of the tracks compared to the lane.

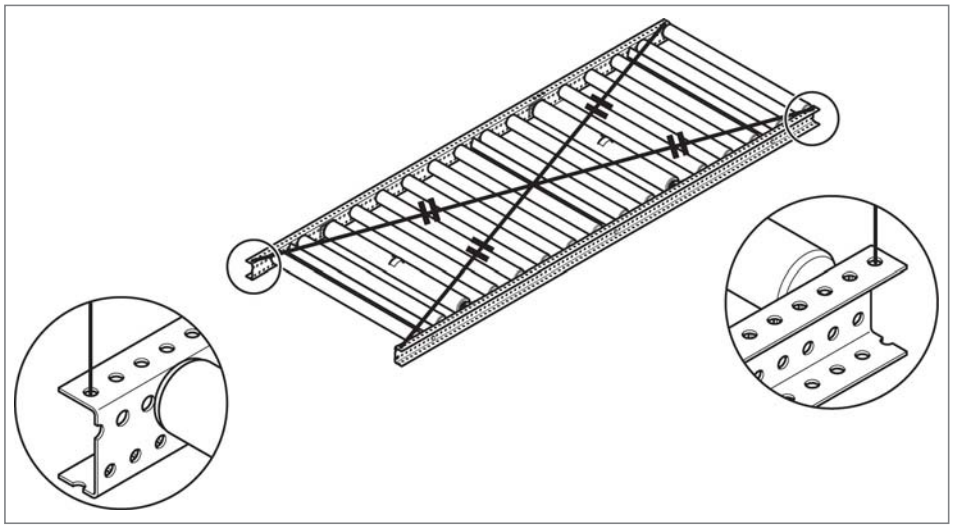


The floor mounting feet must all be level to ensure correct system operations. Adjust the feet if necessary to maintain a slope of 4%.

Refer to the assembly diagrams provided in the appendix for details of STP lane assembly.

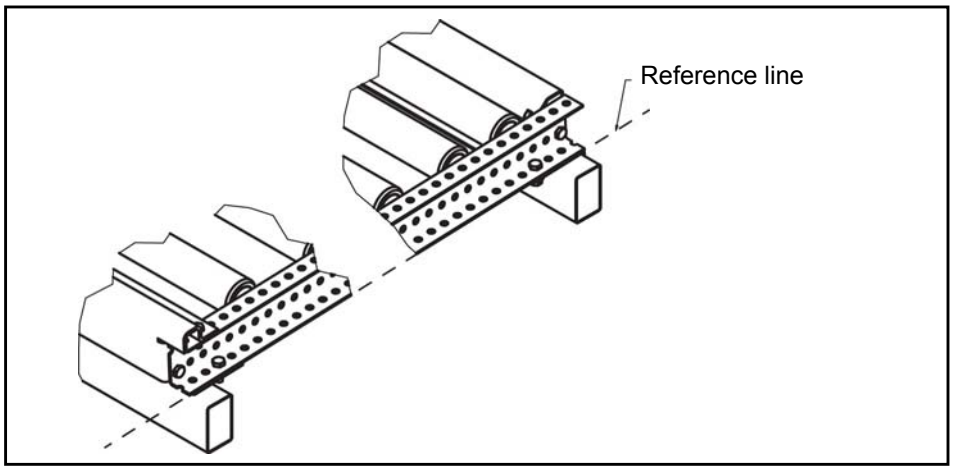
Check the diagonals

► Check that the module's two diagonals are equal.
Measure the diagonals from one axis to another of the holes located at each end of the profiles.

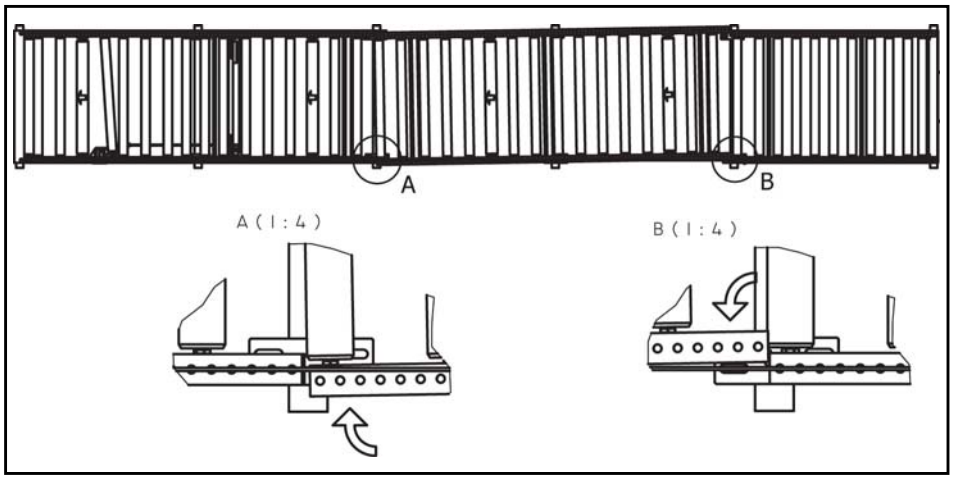


Lane alignment

► A perfect alignment of the modules is essential for correct lane operations.



Realign the modules if necessary.

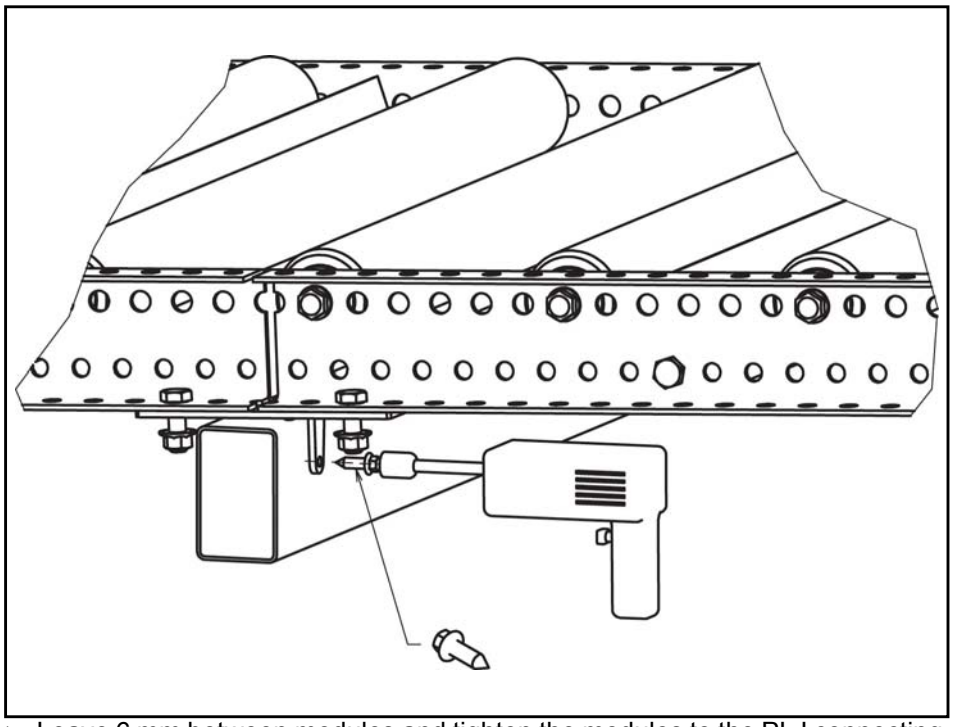


Example of re-alignment.

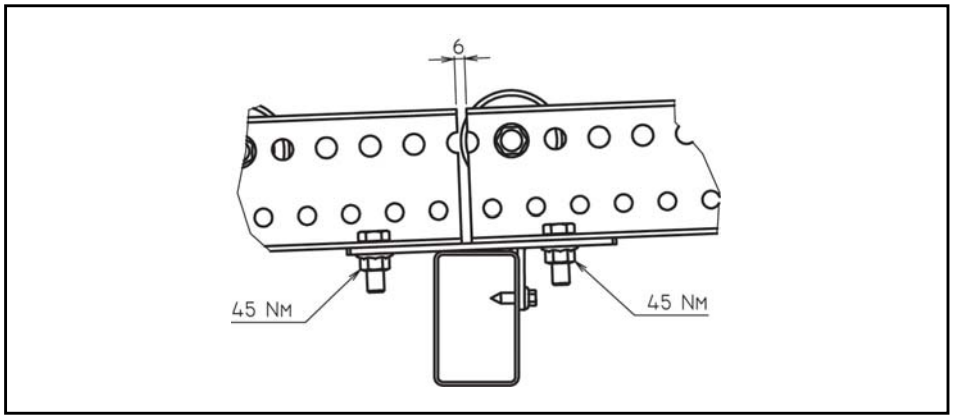
► Attach all the PLJ connecting plates linking the modules with drill screws: recommended torque 8 Nm maximum.

Stop screwing when the mounting bracket of the PLJ connecting plate is in contact with the beam.

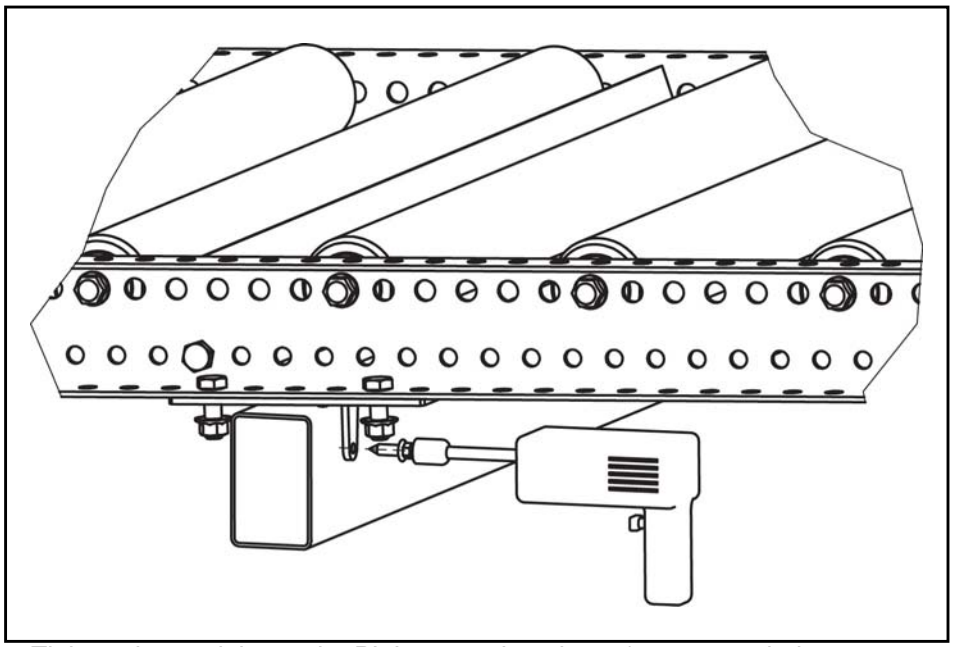
We recommend the use of an extender to facilitate the passage of the socket under the screws 10x30.



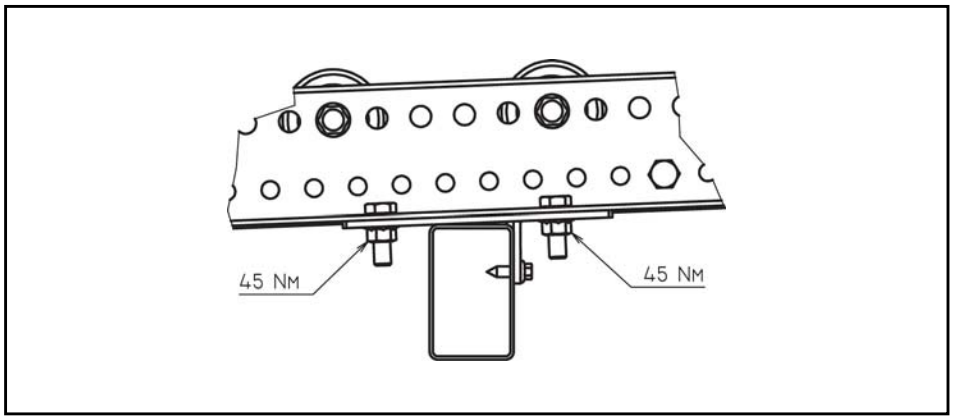
► Leave 6 mm between modules and tighten the modules to the PLJ connecting plates (recommended torque 45 Nm).



► Then attach the other PLJ connecting plates (without a splicing function) using drill screws.



► Tighten the modules to the PLJ connecting plates (recommended torque 45 Nm).



Step 2 – Lane test

Tests of the lanes in the test bay must be carried out in the presence of the assembly manager and the operator. Comply with the technical data described in the order confirmation.

The order confirmation provides the following data:

- Loads (maxi/mini/ mixed)
- Loading/unloading mode
- Containers

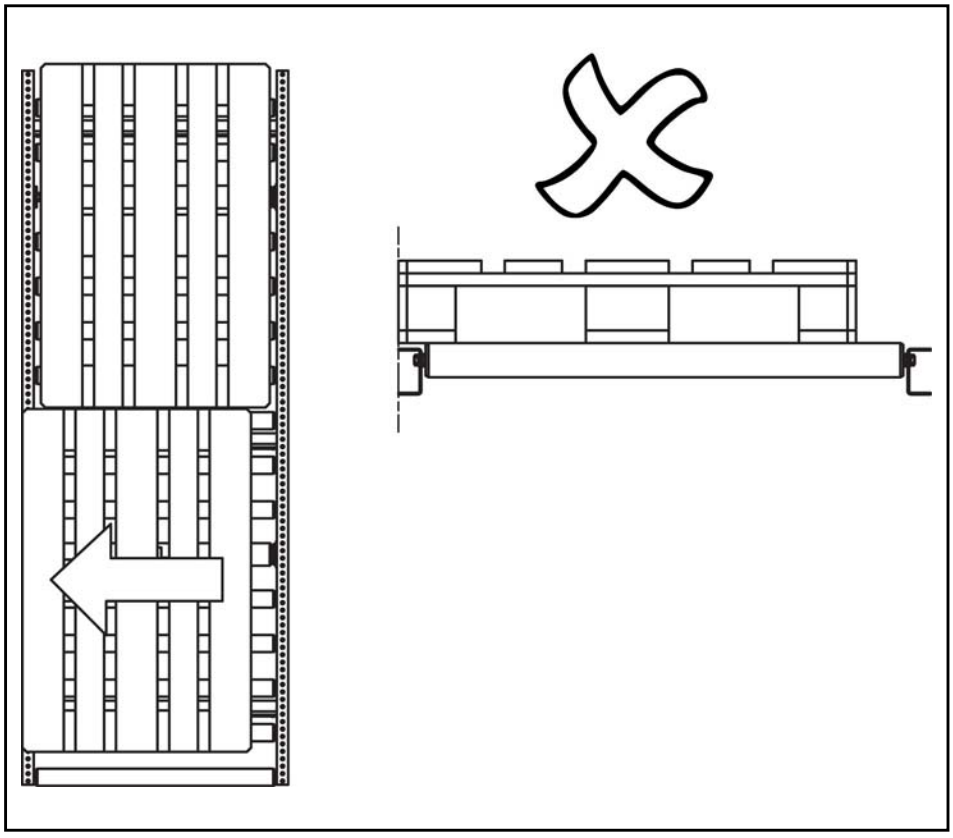
Check the following:

- Correct adjustment of the gravity descent speed for loads
- Loads do not swerve
- Loads restart correctly
- The separator works correctly
- Loads are held correctly on their support
- The end stop works correctly

Pallet descent speed

► Load the lightest pallet defined in the order confirmation.
► Check that the load descends correctly, without swerving or stopping.
► Repeat the operation with the maximum load.

Loads do not swerve



Loads restart correctly

► Unload the container from the front.
► Check that the following containers restart correctly.

The separator works correctly

For a description of the separator operation, *see page 45*.
► Before loading the lane, check that nothing restrains the movement of the separator (flap, rod, end stop).

Loads are held correctly on their container

To prevent loads from falling due to sliding or tipping over, they must be stable and evenly distributed on their container.
► Check that the loads are held correctly on their container when the container stops against the separator stop and/or the end stop.

Operations reports

Operations reports must be prepared for the lanes and for validation of the installation. The end user must sign these reports.
Send a copy of the report to Interroll. Refer to the example of an operations report page 38.

The operations report validates the guarantee. Without the operations report, Interroll cannot guarantee the installation.

Operations report - Pallet Roller Flow FIFO

The operations report validates the guarantee for the dynamic storage lanes provided by Interroll. A copy of this report, countersigned by the assembly manager, the operator or rack manufacturer must be sent to Interroll within a maximum of 4 weeks after delivery of the equipment.

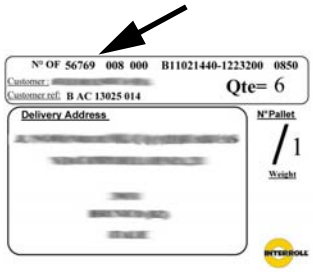
Interroll SAS – Service clients
310, rue du Clair Bocage
BP255 Mouilleron le Captif
F-85006 La Roche-sur-Yon, Cedex
dynamicstorage@interroll.com

Tests must be carried out in presence of the assembly manager, the operator or the rack manufacturer. Comply with the data described in the conditions initially set out in the contract; maximum and minimum loads, loading and unloading modes, containers. The 5 tests described below must all be validated for the guarantee to be in effect.

Follow the instructions for lane tests described in the user manual page 36.

	Compliant
1- Pallet descent speed	☐
2- Loads do not swerve	☐
3- Loads restart correctly	☐
4- The separator works correctly	☐
5- Loads are held correctly on their support	☐

N° OF __ __ __ __ __
Fill in the OF number indicated on the labels attached to the module pallets



Assembly manager

Surname / First name:
Company:
Date:

Signature

The operator or rack manufacturer

Surname / First name:
Company:
Date:

Signature

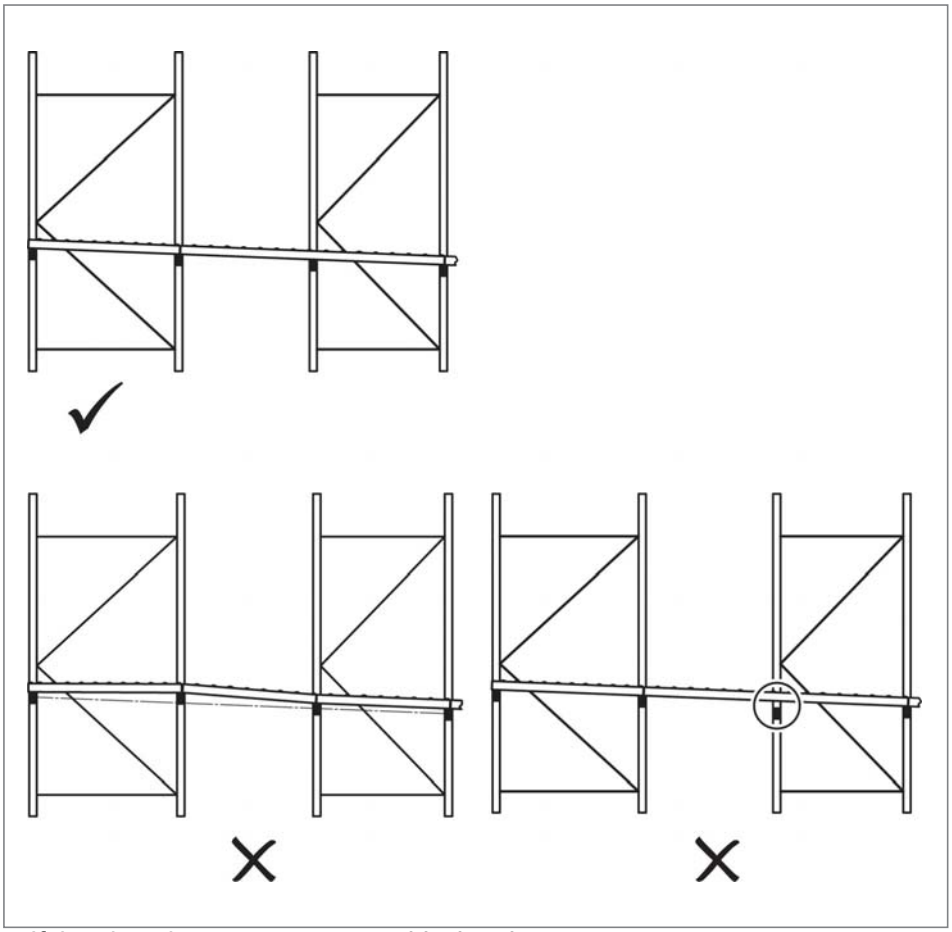
Avoiding swerving or blockage of a container

Finding the causes of the problem

► Check that the rack is correctly assembled, *see "Rack assembly", page 14*.
► Check that the beams are in contact with the modules.

Eliminating pallet blockage

► Check the slope. General recommendation is 4% (or other slope specified in the order confirmation).
► Check that all the beams are in contact with the modules.



► If the slope is correct, *see "Troubleshooting", page 60*.

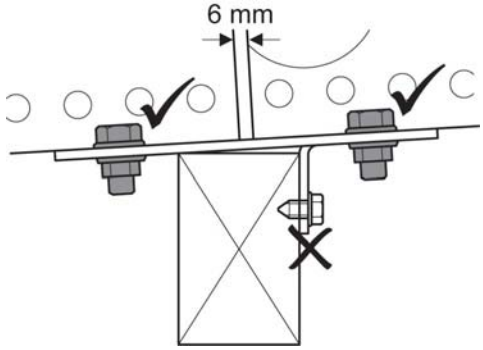
Eliminating swerving

If the rack assembly is correct, you can correct swerving by modifying the 6 mm clearance between the modules.

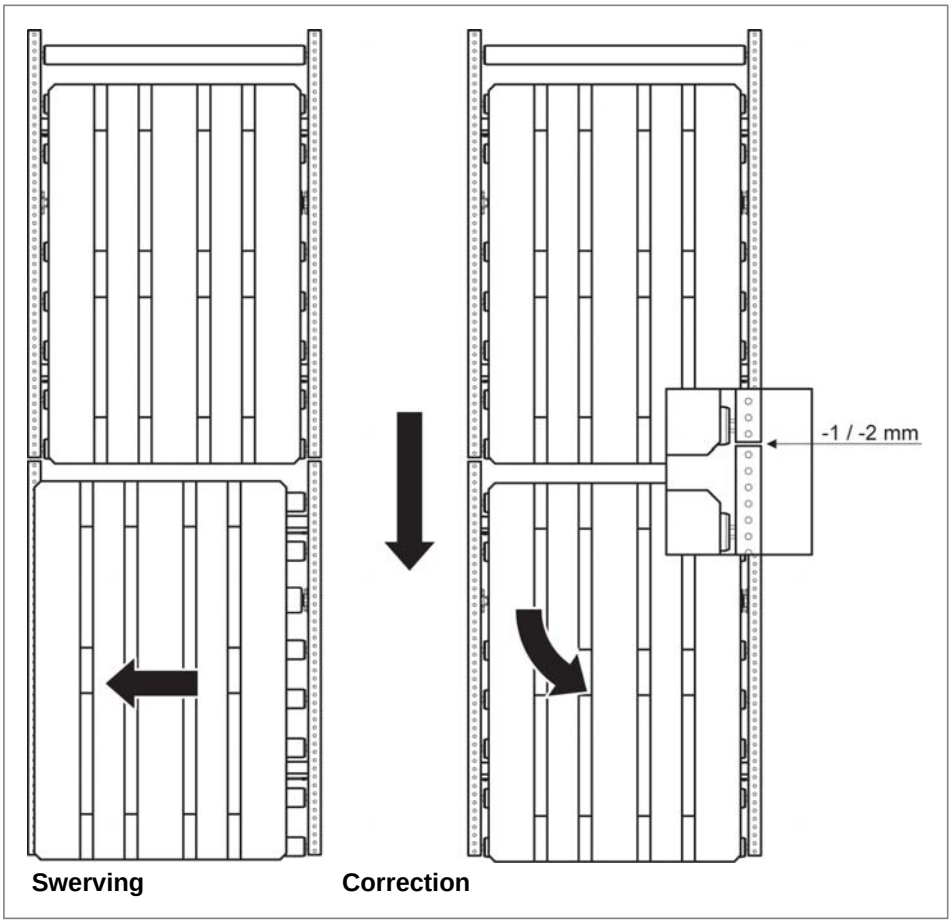
Warning

Risk of injury due to the module tipping

- ► Never loosen the connection between the PLJ connecting plate and the beam.
- ► Only loosen the link between the PLJ connecting plate and the module.



- ► Identify the position where the swerving occurs.
- ► Loosen the screws connecting the PLJ connecting plates to the module on the opposite side from the swerving.
- ► Loosen the cross-ties to align the modules.
- ► Bring the profiles of the two consecutive modules closer together (by 1 or 2 mm).



► Re-tighten the modules on the PLJ connecting plates.
► Re-tighten the cross-ties
► Retest the lane, *see "Step 2 – Lane test", page 36*.

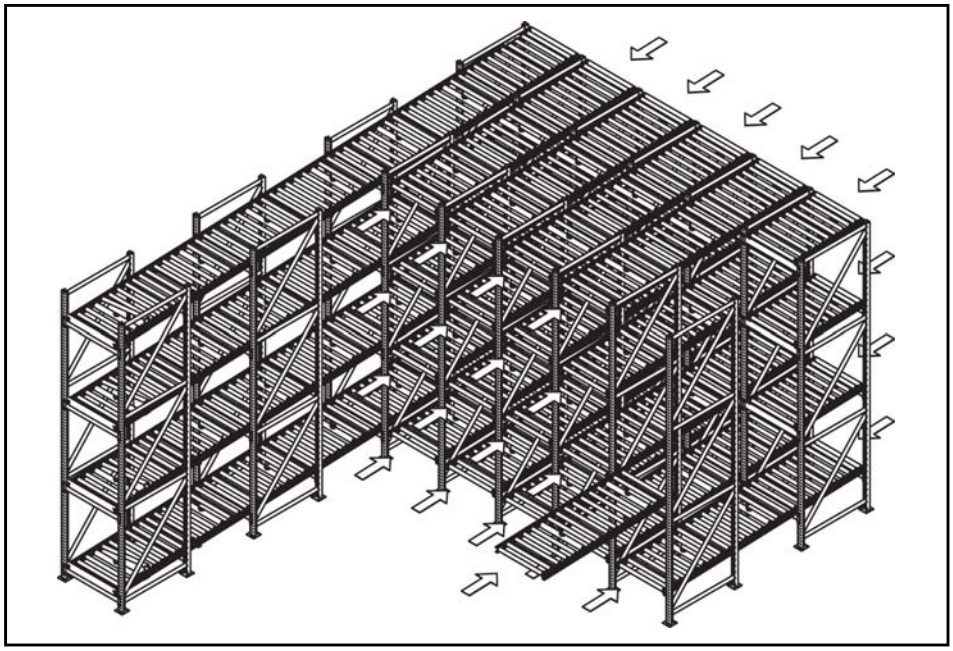
Eliminating pallet blockage

Check the slope is the recommended 4%.
If the slope is correct, *see "Troubleshooting", page 60*.

When all the tests have been validated, proceed to the assembly of the remaining lanes.

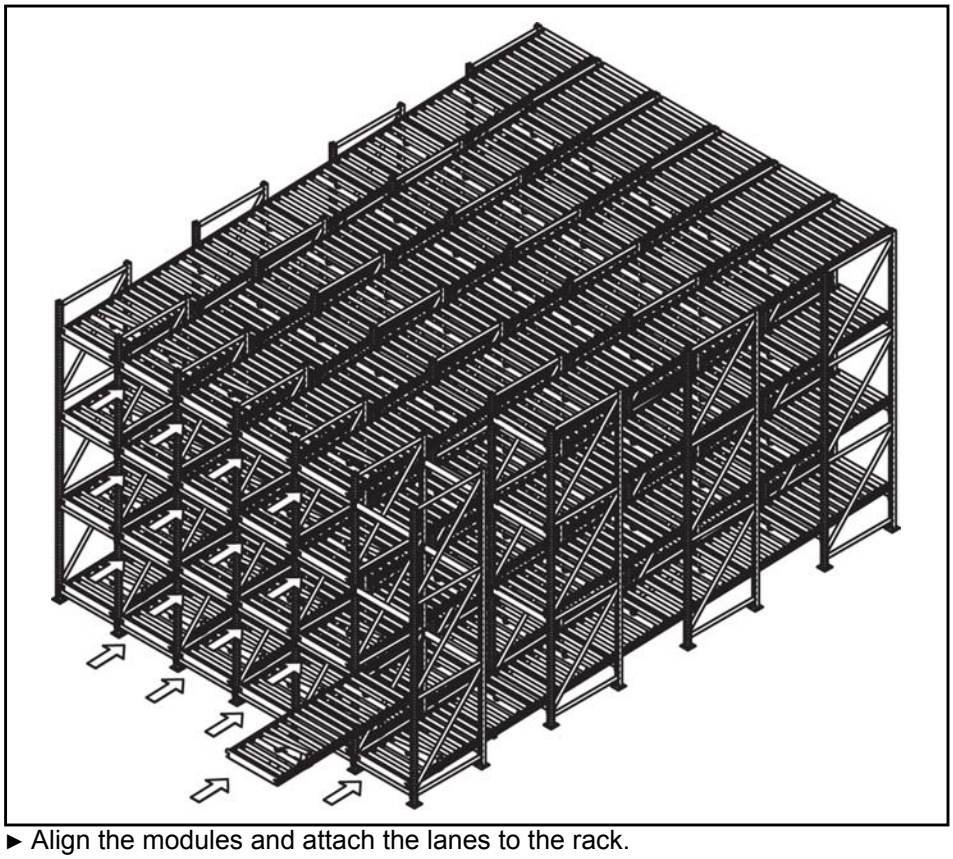
Step 3 - Lane assembly

► To assembly the following lanes, follow the assembly method used for the test bay.



As the rack is perpendicular, you do not need to align the frames with the floor markings. It is recommended to assemble the modules from bottom to top.

► Insert the unloading modules on all levels.



► Align the modules and attach the lanes to the rack.

Start-up and operation

Warnings concerning operations

Warning

Risk of injury in case of improper handling

- ► Insert the containers in the lane on the loading side only.
- ► Do not insert containers in the lane if they do not enter completely into it.
- ► If a container sticks out of the lane, remove it immediately.
- ► Do not load a container if pressure is required to insert it.

Notice

Damage in case of improper handling

Note the following remarks.

- ► Load carefully so as not to damage the lane or the products stored in it.
- ► Never touch the rollers, tracks or the rack with the forks of the forklift.
- ► Never insert or reinsert a container on the unloading side.
- ► In the event of a malfunction or if you see any signs of damage, immediately stop the lane and set up appropriate signage.
- ► For any damage due to impact on a rack or on the roller chassis, immediately inform the company's Maintenance Department.
- ► If you find nuts, screws, or other components on the floor, immediately stop all levels of the bay and the neighbouring bays. Set up appropriate signage.
- ► In the event of a blocked container, remove it and determine the cause of the blockage. If the container appears to be defective, set it aside from the storage zone.
- ► If the container is blocked repeatedly at a given point, inform the company's Maintenance Department so they can take appropriate action.
- ► In order to prevent loads from tipping over, provide safety equipment such as grates or nets.

Before starting up the installation, all operations staff must be informed about:

- **The specific use of a dynamic storage installation**
- **All the risks inherent in a dynamic storage system, such as falling loads, moving loads, cut-offs.**

Checks before the initial start-up

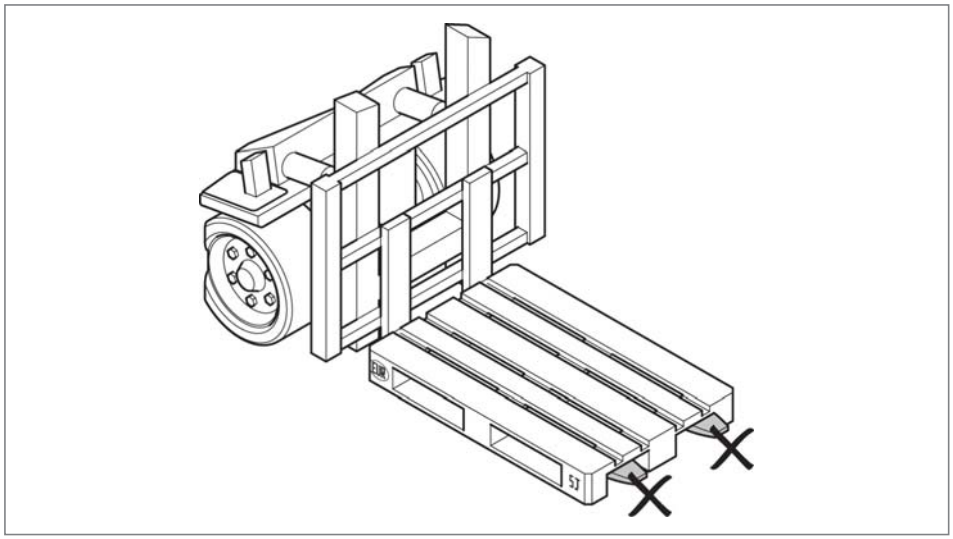
- ► When connecting the storage lanes and other equipment in the warehouse, perform a risk analysis of the entire installation.
- ► In order to use the installation in a safe configuration, verify the suitability of the width of the rows, the height of the installation, and the characteristics of the forklifts, e.g. original manufacturer's protections, turning radius, stability and maximum load compared to the height.
- ► Check that the racks and lanes do not have any visible damage.
- ► Check that there is no foreign material in the working area.
- ► Check that all signage is in place (load capacity plate, restrictions for use).

Forklift requirements

The forklifts are described in the order confirmation.

The forks

- The forks must be suitable for the depth of the container. Recommended length: from 1150 mm to 1200 mm.
- The fork spacing changes according to the type of pallet used so as to carry the loads in a stable manner without damaging the container.



Lifting height

- The maximum lifting height of the forklift should enable risk-free loading and unloading at all levels of the installation.

Technical characteristics

The forklift's technical characteristics must be suitable for the containers to be stored as well as for the height of the loading and unloading zones.

Loading and unloading methods

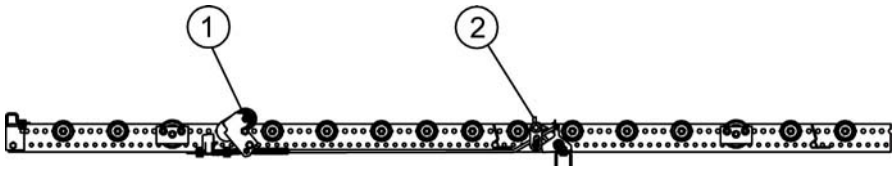
Recommended equipment

It is recommended to use forklifts with the following equipment:

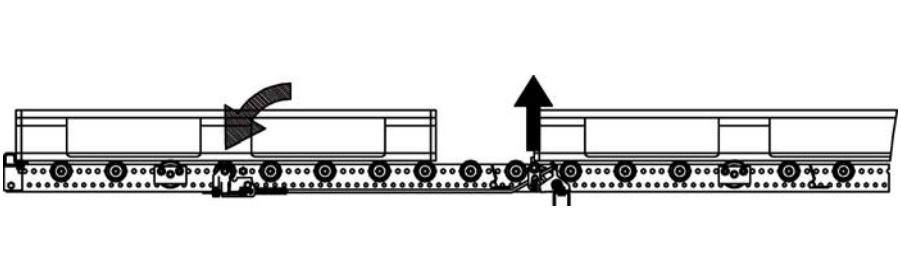
- A angle measuring system, in order to accurately adjust the forks
- A (vertical) or dual (vertical and horizontal) indexing system if two pallets must be front loaded at the same time
- An embedded camera system for the forks
- Visual markers

Operating principle of the separator

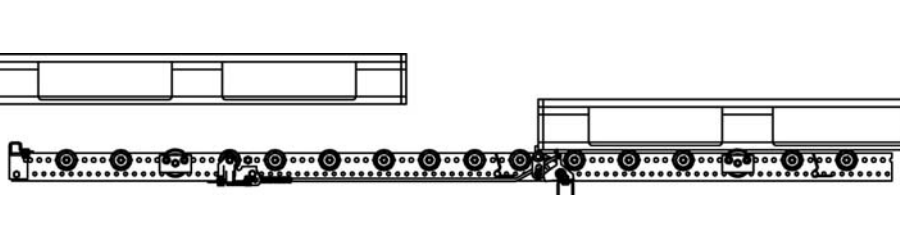
The separator comprises two components:



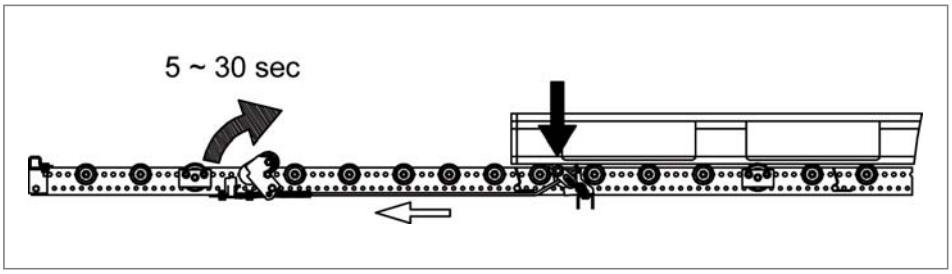
(1) Separator flap
(2) Separator stop (regular, heavy or double front)



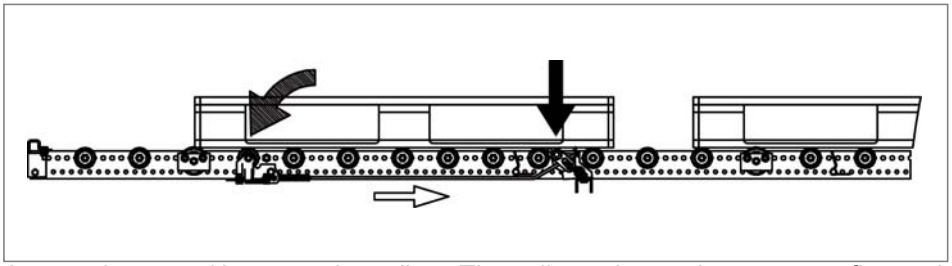
Pressing on the separator flap locks the stop. This stops the second pallet and creates a separation.



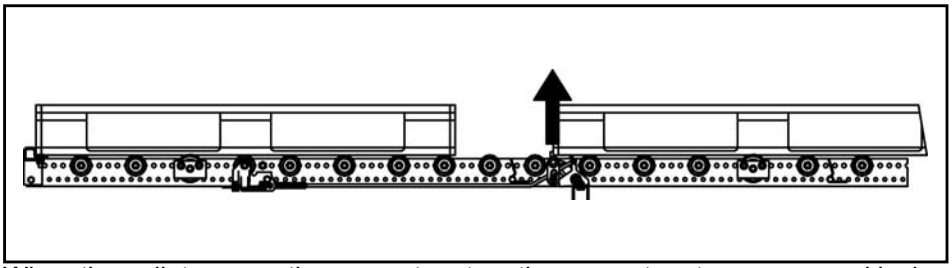
This separation enables the first pallet to be unloaded without hindrance from the accumulated pressure of the pallet line; during unloading the flap remains in the low position thanks to the Time Plus function, while the separator stop is in the up position.



With the Time Plus function, the separator flap moves up after 5 to 30 seconds depending on the settings. The separator stop is then unlocked and the next pallet is freed.



A space is created between the pallets. The pallet activates the separator flap and slides over the separator stop.



When the pallet passes the separator stop, the separator stop moves and locks in the vertical position, to stop the next pallet.

Operation

Close down a lane if you observe any of the following:

- Suspicious noise
- A visibly worn component
- A blocked or swerved container
- A deteriorated rack
- A defective attachment between the lane and the rack.
- A component which has failed or which is not operating correctly

Checks before each start-up

► Check that everyone present is informed and trained on the use of the system, and that no one is in a position of danger.

► Check that there is no visible degradation to the lanes or the rack.

► Check that there is no foreign material preventing correct operation of the installation.

► Check that all signage is in place (load capacity and restrictions for use).

Loading a container

Warning

Risk of injury in case of improper handling

- ► Insert the containers in the lane on the loading side only.
- ► Do not insert containers in the lane if they do not enter completely into it.
- ► Do not load a container if pressure is required to insert it.
- ► In the event of a blocked container, remove it and determine the cause of the blockage.

Notice

Damage in case of improper handling

- ► Load carefully so as not to damage the lane or the products stored in it.
- ► Never touch the rollers or the rack with the forks of the forklift.
- ► Never insert or reinsert a container on the unloading side.

The time between two loadings must be:

- For a standard speed controller: 30 loads per hour maximum
- For a high performance speed controller: rate of 60 loads per hour maximum
  The rate can be extended to 90 loads per hour for a 10 minute period, every 2 hours.

► Check the bottom of the container in order to detect any possible damage or breakage of the skids, or the presence of nails or foreign materials.

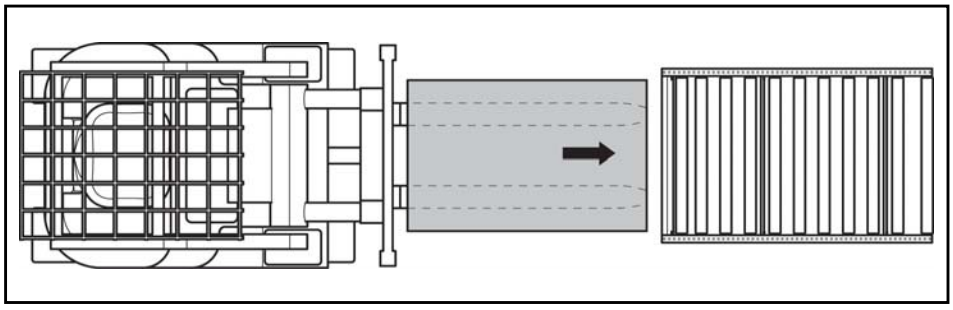
► Damaged containers should not be used in a dynamic lane; they should be removed from the storage zone.
Make sure that the container to be loaded is one of those described in the order confirmation.

► Insert the forks of the forklift under the container.

► Raise the container gently.

► Slowly approach the installation on the loading side.

► Align and centre the container correctly in the lane.

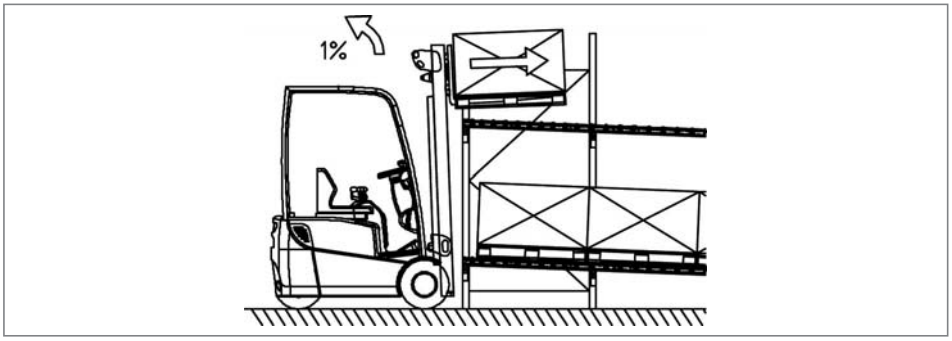


► Position the container at the correct height. The container must be aligned and centred in the lane. The entry guides are used only for guiding - they should not be used as support points to position the container.

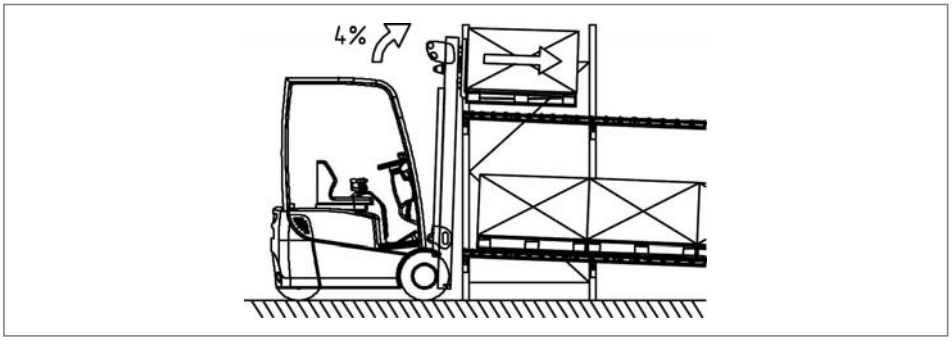
TR loading mode

► Tilt the forks at 1% towards the forklift.

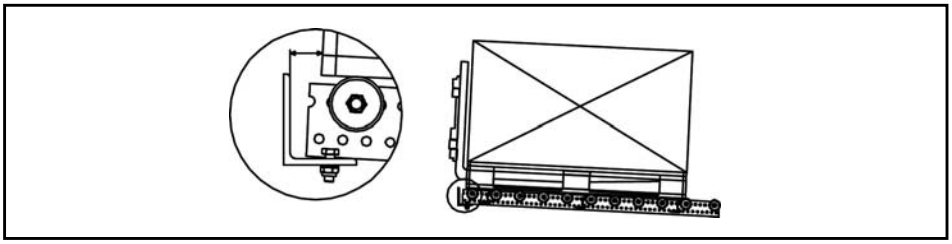
► Slowly move the forklift forward in the axis of the lane on the loading side until the container is fully engaged in the lane.



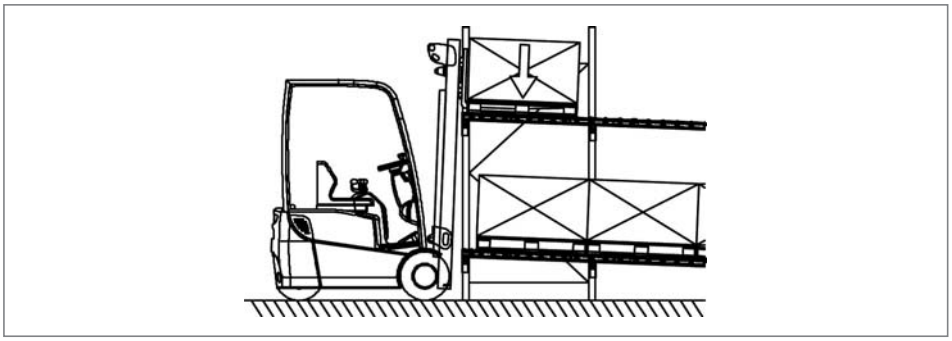
► Tilt the forks using the forklift at the same slope as the dynamic lane (4%).



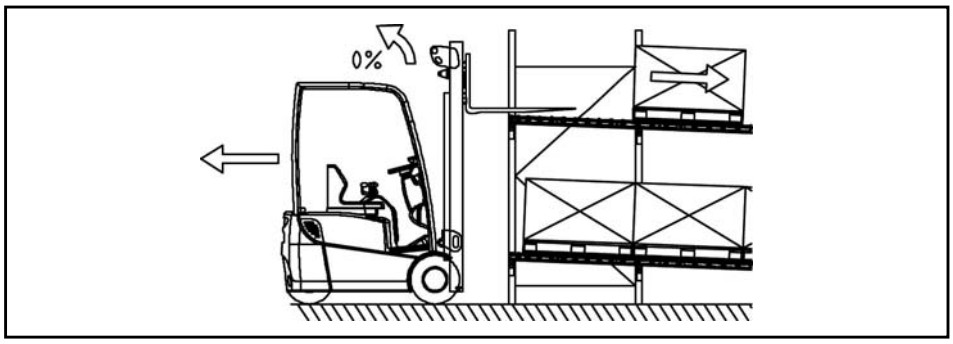
► In the event of an angle beam, it is important to position the container behind the angle beam in order to avoid any damage or blocking.



► Carefully place the container in the lane, without jarring the container. The container must not be placed abruptly. The maximum speed of descent of the forks is 0.1 m/sec.

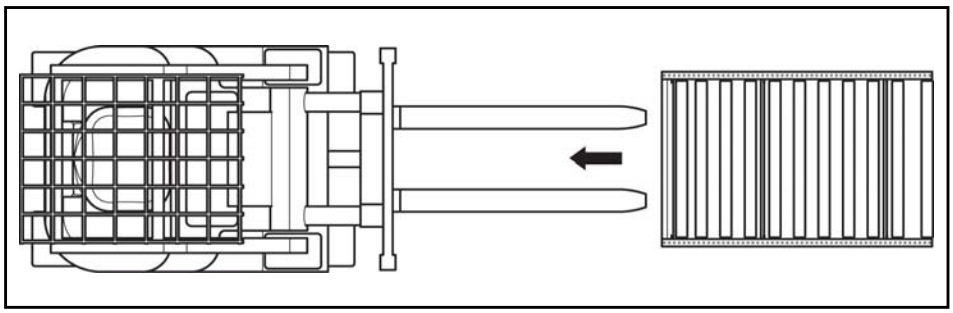


► As soon as the forks no longer hold the container, it starts to move down the lane and frees the forks. Reposition the forks horizontally before reversing.



► If the container is stopped (because the lane is full), keep the slope and adjust the height of the forks while withdrawing them.

► Gently remove the forklift from the lane while keeping the alignment.



3TL loading mode

Loading uses the same method as for TR loading, but without inclining the forks, as these descend between the tracks

Unloading a container

Warning

Risk of injury in case of improper handling

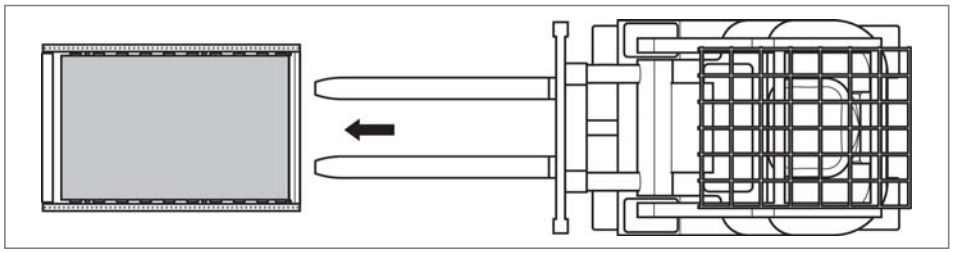
- ► Remove the containers using only the forklift described in the order confirmation.
- ► Never remove containers by hand (picking).

Notice

Damage in case of improper handling

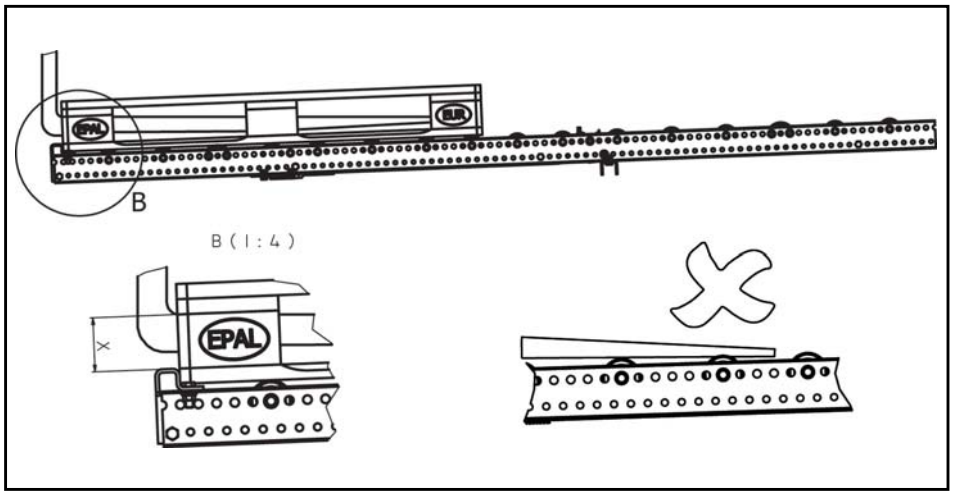
- ► Unload carefully so as not to damage the lane or the products stored in it.
- ► Never touch the rollers, tracks or the rack with the forks of the forklift.
- ► Never insert or reinsert a container on the unloading side.

► Advance the forklift gently on the unloading side of the installation: keep it centred and in the axis of the lane.

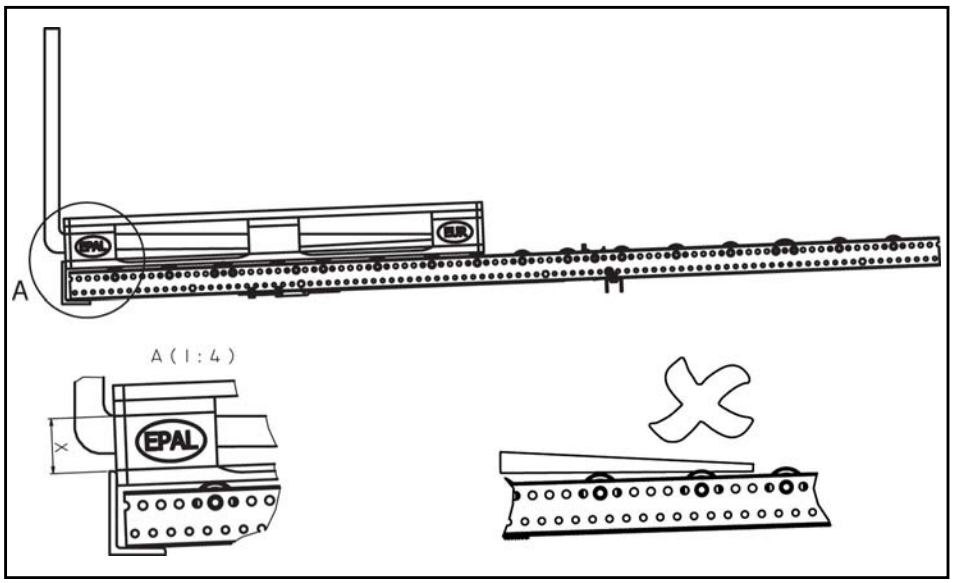


► Position the forks at the correct height.
Ensure that the thickness of the forks is compatible with the height of passage X. The extremity of the forks must not hit the rollers.

Closed beam

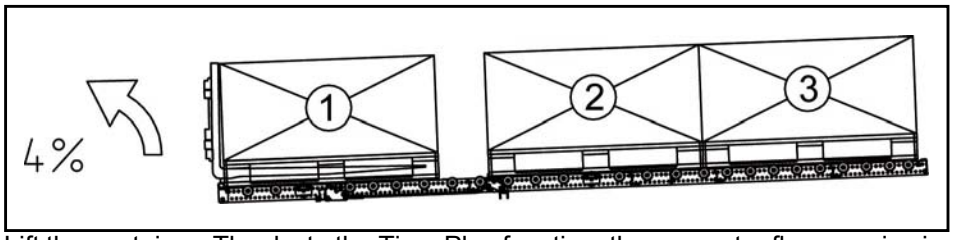


Angle beam



TR unloading mode

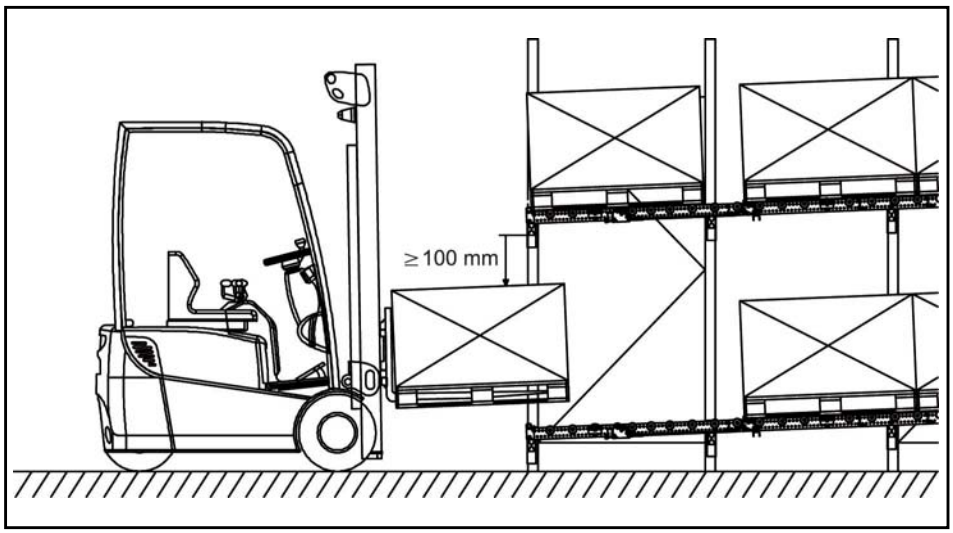
Insert the forks under the container and incline progressively to 4%.

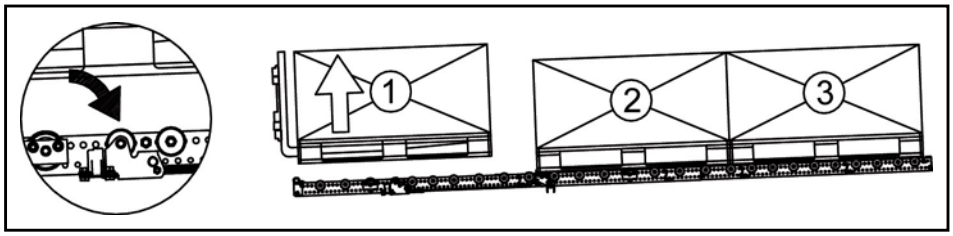


Lift the container. Thanks to the Time Plus function, the separator flap remains in the low position for 5 to 30 seconds (depending on the settings).

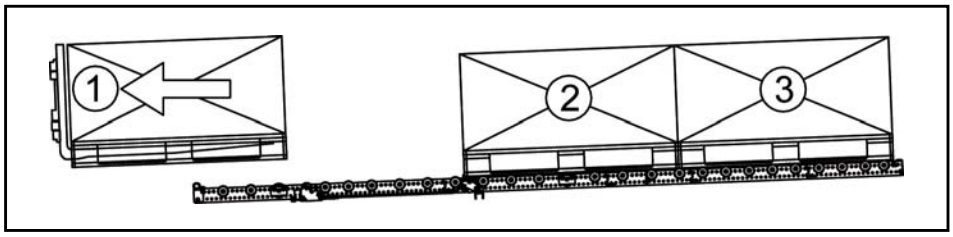
In case of a picking error, the Time Plus function even enables the container to be replaced in the lane as long as the separator stop is not locked.

► If the top of the container touches the bottom of the upper beam, reposition the forks horizontally or adjust their height.





When reversing the forklift, remain in the axis of the lane.

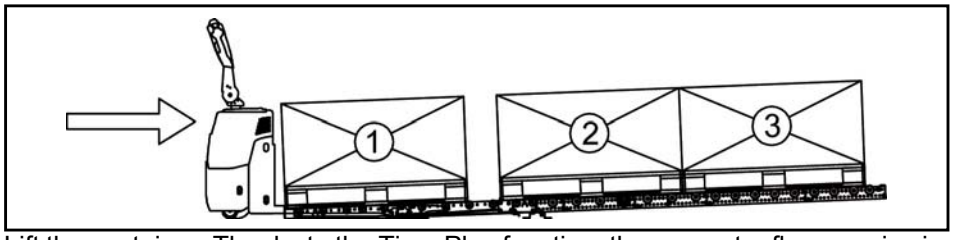


3TL unloading mode

Unloading uses the same method as for TR unloading, but without inclining the forks, as these descend between the tracks

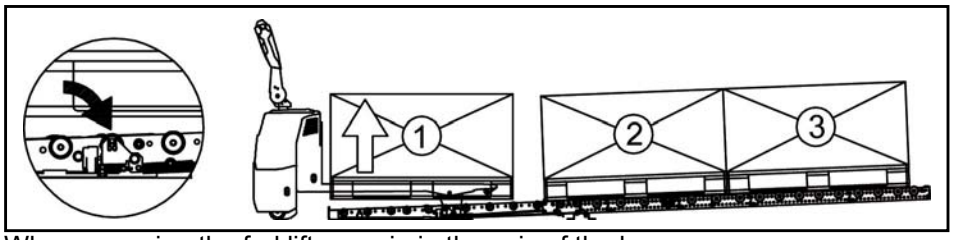
STP unloading mode

Enter the forklift between the protections.

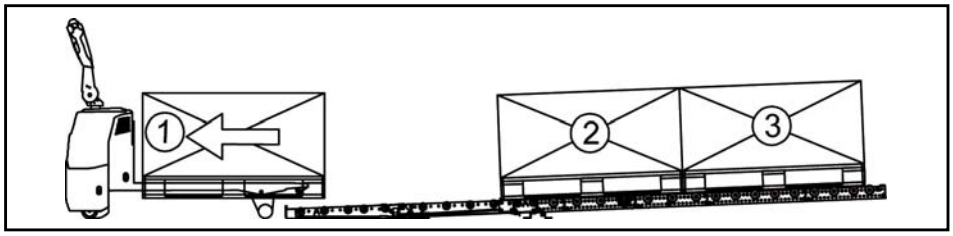


Lift the container. Thanks to the Time Plus function, the separator flap remains in the low position for 5 to 30 seconds (depending on the settings).

In case of a picking error, the Time Plus function even enables the container to be replaced in the lane as long as the separator stop is not locked.



When reversing the forklift, remain in the axis of the lane.



What to do in case of an accident or failure

► Stop the lane.
► Secure the area and set up appropriate signage
► In the event of an accident:provide first aid and call the emergency services.
► Inform qualified maintenance personnel.
► Have the system repaired by qualified maintenance personnel.
► Do not use the lane until authorised by qualified maintenance personnel.

Cleaning, maintenance and repair

Cleaning

Notice

Damage in case of improper cleaning

► Do not use abrasive products, pressurised jets, or products which may cause oxidisation or damage the equipment.

► Clean the lane using dry cloths.

Remark in case of maintenance and repair

Warning

Risk of injury in case of improper intervention

► Maintenance must only be carried out by qualified and regularly trained personnel, in compliance with safety and other instructions.

► Wear Personal Protective Equipment (PPE).

Before any intervention, you must take into account:

- Safety instructions concerning the work area, e.g. movements in the area, welding, grinding, and the duration of maintenance operations for cold rooms.
- Specifications particular to the company where the installation is used.
- Technical data provided in the order confirmation.
- Maintenance procedures of the various products: dynamic lanes, racks, environment (e.g. sprinklers).

Preparing an intervention

► Define a safety zone around the working area.

► The safety zone includes the entire height of the bay as well as the two adjacent bays.

► Secure the zone and set up appropriate signage, nets, etc.

► Remove everything from the lane involved in the intervention before starting.

► Make sure that the area of intervention has sufficient lighting.

Performing an intervention

► At the end of the intervention, make a visual inspection of the repaired section to ensure that you did not leave any foreign materials or tools which may alter the correct operation of the installation.

► Before restarting the system, check the integrity of the lane, the rack and its environment, e.g. sprinklers.

Maintenance equipment

Lane maintenance can be performed using the following equipment:

- Platform with a rotary barrier
- Maintenance pallet

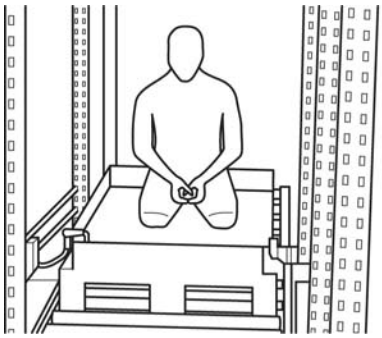
Platform

The platform may be used for maintenance from the rows, on either the loading or unloading side. Use a safety harness and always attach yourself before moving.

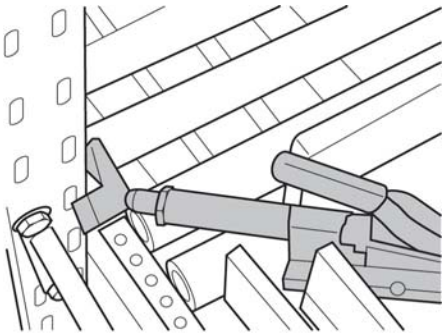
Maintenance pallet

The maintenance pallet allows you to:

- Work at a fixed position on a lane, by locking the pallet on the profiles or uprights
- Carry tools and components



Example of maintenance pallet



Attaching the maintenance pallet

Using a maintenance pallet

Two people are required in order to use a maintenance pallet :

- one who works on the pallet
- another who provides assistance, while remaining in the boom lift

To raise the operator to the lane, use an appropriate lift such as a boom lift according to the rules applicable in the country.

Warning

Risk of falling due to the rotating rollers

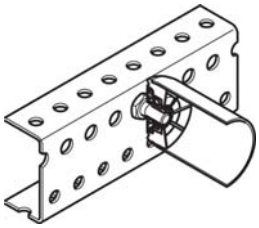
- ► Never walk on the rollers nor on the profiles.
- ► When working on the lane, you must always be attached using a safety harness.
- ► Check that the system for locking the pallet on the profiles is working correctly.
- ► Check the operation of the system for attaching the hoist next to the pallet.
- ► Check the operation of the system for attaching the hoist ahead of the lane to the rollers on the rack.
- ► Using a lifting device or boom, position yourself on the loading side in front of the lane located next to the lane requiring maintenance.
- ► Use a forklift to position the maintenance pallet next to the loading side of the lane where maintenance is required. Position it in that lane.
- ► Block the pallet when it is loaded using the locking system.
- ► Position yourself opposite the lane using a boom or lifting device.
- ► Attach yourself to the rack using the safety harness.
- ► Climb onto the maintenance pallet and sit down in it.
- ► With the assistance from the second operator in the boom, install the system for attaching the hoist ahead of the lane to the rollers on the rack.
- ► Install the attachment system on the side of the pallet.
- ► Unlock the pallet and control its descent to the location requiring maintenance. Readjust the safety harness.
- ► When you reach the location requiring maintenance, lock the pallet to the profile and attach yourself to the rack using the safety harness.
- ► Perform the maintenance.
- ► When finished, unlock the pallet and let it descend.
- ► Position the boom lift opposite.
- ► Remove the safety harness from the rack.
- ► Move out of the maintenance pallet and into the boom lift.
- ► Use a forklift to remove the maintenance pallet, like any other pallet.

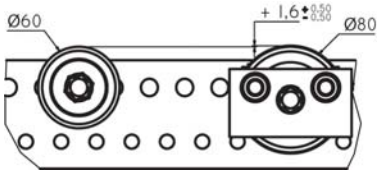
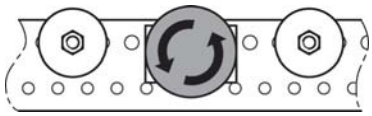
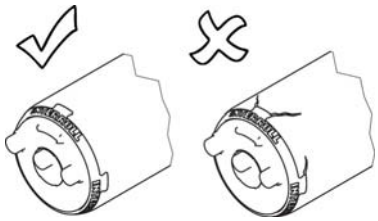
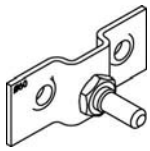
List of maintenance and inspection operations

In order to keep the installation in perfect operational condition, you must systematically replace any damaged components.

Maintain a log of the checks and maintenance performed on the installation. Failing which, the operator shall be held responsible in case of an incident or an accident on the installation, and cannot claim any guarantee nor indemnity from Interroll.

The safety mechanisms (speed controller, separator and end of lane stop) should be replaced exclusively by trained personnel certified by Interroll.

Pallet Roller Flow FIFO		**Date:**	
Component	**Tasks/Checks**	**Work required**	**Performed by**
Loading plate	Visual inspection	Inspection: no impact, no trace of the start of a fracture	
	Check the tightening	Re-tighten if necessary to 45 Nm.	
Roller	Visual inspection	Inspection: no impact (on the tube or the ends)	
	Check that the roller rotates freely	Turn the roller. Free the roller if necessary, or replace it if required.	
	Check the tightening of the inserts on the profiles 	Raise the roller and check that the insert is held properly. Re-tighten if necessary to 45 Nm.	
	Check the condition and tightening of the roller ends. Gap tolerance: max. 3 mm of axial clearance	Slide the roller from side to side to check the axial clearance. Replace the roller if necessary.	

Pallet Roller Flow FIFO		Date:	
Component	**Tasks/Checks**	**Work required**	**Performed by**
Speed controllers	Check the condition and tightening of the speed controller roller ends. Gap tolerance: max. 3 mm of axial clearance. The brake may project past the rollers by 1.6 mm on each side of the roller 	Check the tolerance. Replace it if necessary. Contact Interroll for a quote for replacement.	
	Check that effort is required for pallet descent. 	If the brake is blocked, or if it rotates freely, if only a slight effort is required to turn it, or if it makes a suspicious noise, have it replaced. When in doubt, contact Interroll for a quote for replacement.	
	No deterioration on tightening 	Perform a visual inspection of tightening	
	Perform a visual inspection of the attachment of the speed controller roller to the BU80 profile.	Replace the speed controller if necessary. Contact Interroll for a quote for replacement.	
	Check that the insert is correctly tightened. 	Perform a visual inspection, Tighten it if required, with a torque of 45 Nm.	
	Visual inspection of the tube	Inspection: no impact (on the tube or the end)	
	Check the tightening of the screws on the profiles	Raise the roller and check that the screws are held properly. Re-tighten if necessary to 45 Nm.	

Pallet Roller Flow FIFO		Date:	
Component	**Tasks/Checks**	**Work required**	**Performed by**
Separator flap and stop	Check that nothing obstructs the movement of the separator, *see "Operating principle of the separator", page 45*	Free the mechanism if necessary, or replace it if required.	
	Visual inspection	Inspection: no impact, no trace of the start of a fracture	
	Check that the real operation time of the "Time Plus" corresponds to the time of use	Time from the moment when the container is lifted to the locking of the separator stop	
Components for attaching the modules to the rack or the floor	Check the tightening	Re-tighten if necessary to 45 Nm.	
	Visual inspection	Inspection: no impact, no trace of the start of a fracture	
Cross-tie	Check the tightening	Re-tighten if necessary to 45 Nm.	

Troubleshooting

In the event of a failure

- ► Stop using the lane and any lane which may be damaged by the failure.
- ► Secure the area and set up appropriate signage
- ► Only qualified maintenance personnel should repair the failure.
- ► Never try to hold back a container freed during a manipulation.
- ► Before restarting the system, check the integrity of the lane, the rack and its environment, e.g. sprinklers.
  Follow the maintenance procedures of the various products : dynamic lanes, racks, environment.

Blocked container

There may be many reasons causing a container to be blocked and preventing it from starting; this is not necessarily a defect in the installation. Inserting a new container usually corrects the problem.

- ► In the event of a container blocked in the middle of a lane and/or against the rack, remove the containers via the lanes located to either side by transferring them to another pallet.
- ► If you cannot unload via the side lanes, unload via the loading side. Use a hoist to move the blocked container as well as the upstream containers.
- ► In the event of unstable content, first secure the area. Then use a boom lift to access the content and either stabilise or unload it.
- ► Check whether the lane or the rack were damaged by the blocked container.

Content falls to the floor

- ► If content has fallen to the floor, you must secure the area before taking any further action.

Troubleshooting

Technical data in the order confirmation is noted below by the abbreviation "OCTD".

Failure	Cause	Correction
Immobilised pallet	Damaged pallet: • Nails sticking out under the pallet • Cracked, broken or missing skid • Damaged block • Nails loose on skid	Remove the pallet from operation.
	Pallet characteristics not compliant with OCTD (type, dimensions, moisture content, weight and stored load)	Remove the pallet from operation.
	Foreign particles attached to the pallet or when the pallet is packed under plastic film	Remove the foreign particles.
	Load unevenly distributed on pallets	Recondition the pallet.
	Damaged speed control roller, *see "List of maintenance and inspection operations", page 56*	Replace it if necessary.
	Damaged roller, *see "List of maintenance and inspection operations", page 56*	Replace the roller if necessary.
	Lane alignment incorrect if the pallet is in contact with the rack, *see "Rack assembly", page 14*	Correct the alignment if necessary.
	Damaged rack: see the rack maintenance procedure	Replace the rack if necessary.
Speed not controlled (> 0.3 m/sec.)	Damaged speed control roller, *see "List of maintenance and inspection operations", page 56*	Replace the speed controller if necessary.
	Pallet load greater than the OCTD	Ensure the load is compliant with the OCTD.
	Pallet characteristics not compliant with OCTD (type, dimensions, moisture content, weight and stored load)	Remove the pallet from operation.

Failure	Cause	Correction
No separation between pallets	Damaged speed control rollers before and/or after the separator stop, *see "List of maintenance and inspection operations", page 56*	Replace them if necessary.
	Weight ratio between the lightest and heaviest pallet non-complaint with the OCTD	Ensure the load ratio is compliant with the OCTD.
	Damaged separator, *see "List of maintenance and inspection operations", page 56*	Replace it if necessary.
	Incorrect handling	Comply with the unloading procedures, *see "Unloading a container", page 50*.

Decommissioning and scrapping

Waste disposal

Recommendation for protecting the environment

As far as possible, the packaging should be disposed of in an environmentally friendly way.

Interroll can provide the component contents (type and quantity) upon request.

The speed control rollers contain lead.

The rollers and speed controllers contain plastic.

- ► For all maintenance work, and when disposing of equipment, please comply with environmental standards and use appropriate disposal methods.
- ► In the event of cleaning with substances which may harm the environment, store those substances in suitable containers which may be handled. Close and dispose of them using appropriate methods. Comply with the warnings on the packaging of harmful substances.

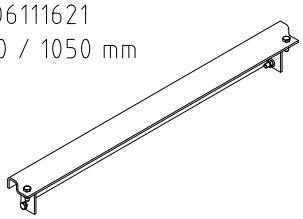
Appendix

Identification of kits and spare parts on the modules

Spare parts

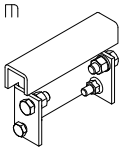
End stop RT

AS-A06111621
EL: 850 / 1050 mm



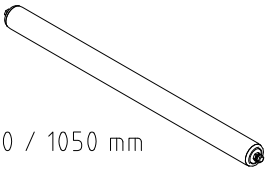
End stop S3R

AS-A03101520
EL: 110 / 130 / 210 mm



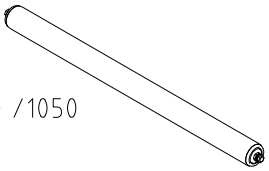
Roller Ø60x1.5 Zn & Ac

AS-G11041523
EL: 110 / 130 / 210
432 / 532 / 732/ 850 / 1050 mm



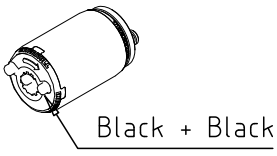
Roller Ø60x2 Zn

AS-G11041522
EL' (EL-24): 850 /1050



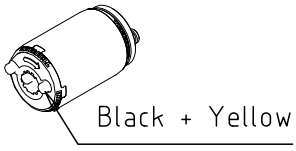
Basic SC EL= 130

AS-G13052710
EL: 130 mm



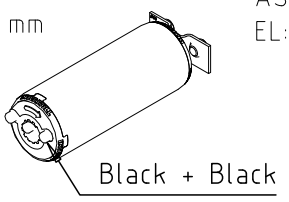
Magnetic SC EL= 130

AS-G12120710
EL: 130 mm



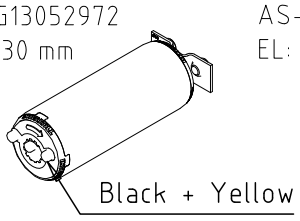
BSC EL= 230

AS-B13091872
EL: 230 mm



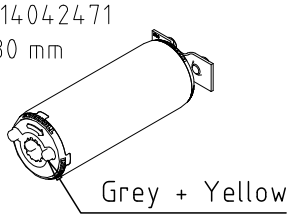
MSC EL= 230

AS-G13052972
EL: 230 mm



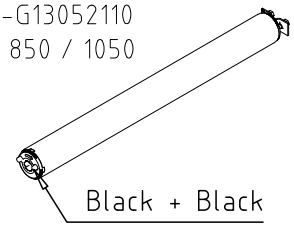
MSC DF EL= 230

AS-G14042471
EL: 230 mm



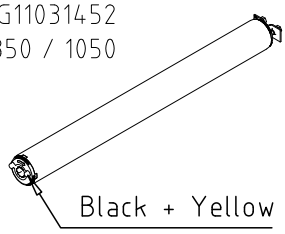
Basic SC

AS-G13052110
EL: 850 / 1050



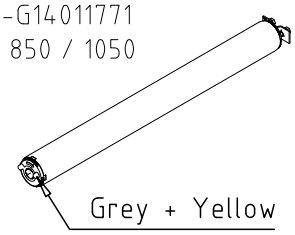
Magnetic SC

AS-G11031452
EL: 850 / 1050



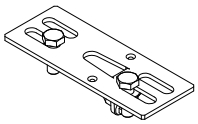
Magnetic SC deep freeze

AS-G14011771
EL: 850 / 1050



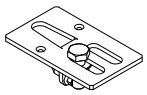
Connecting plate long

AS-F03100721



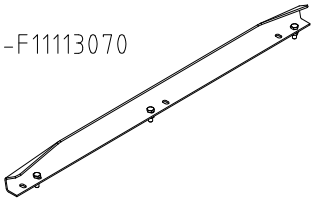
Connecting plate short

AS-F03100722

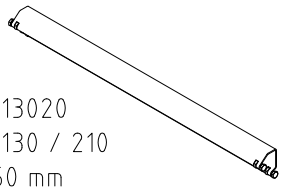


Loading guide

AS-F11113070



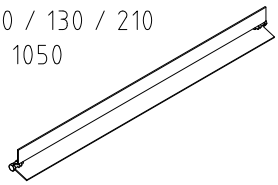
Loading plate



AS-F04013020
EL: 110 / 130 / 210
850 / 1050 mm

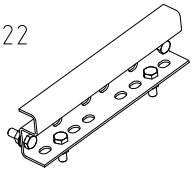
Cross-tie PL

AS-F04030221
EL: 110 / 130 / 210
850 / 1050

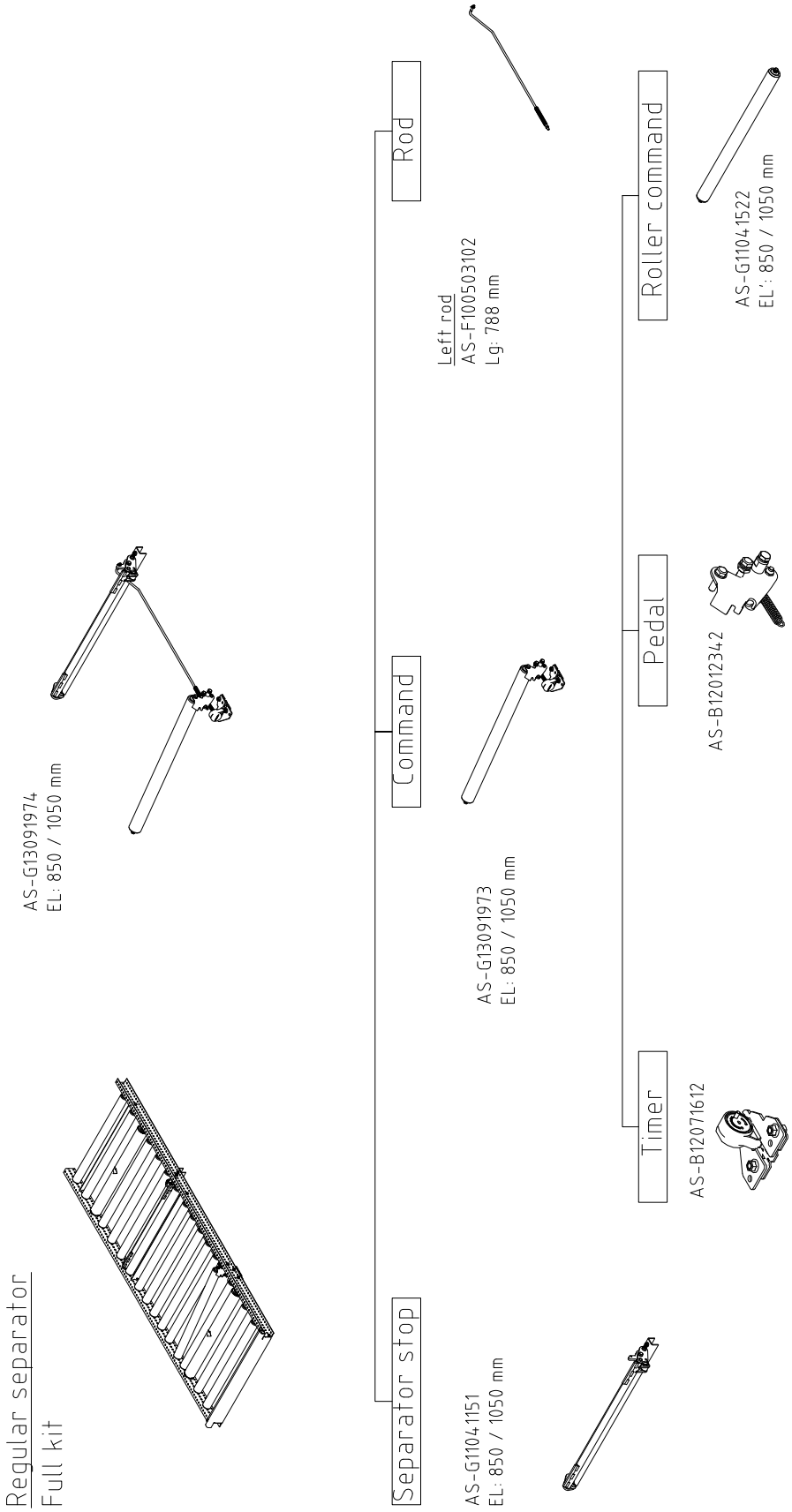


Splicing plate

AS-F03102722

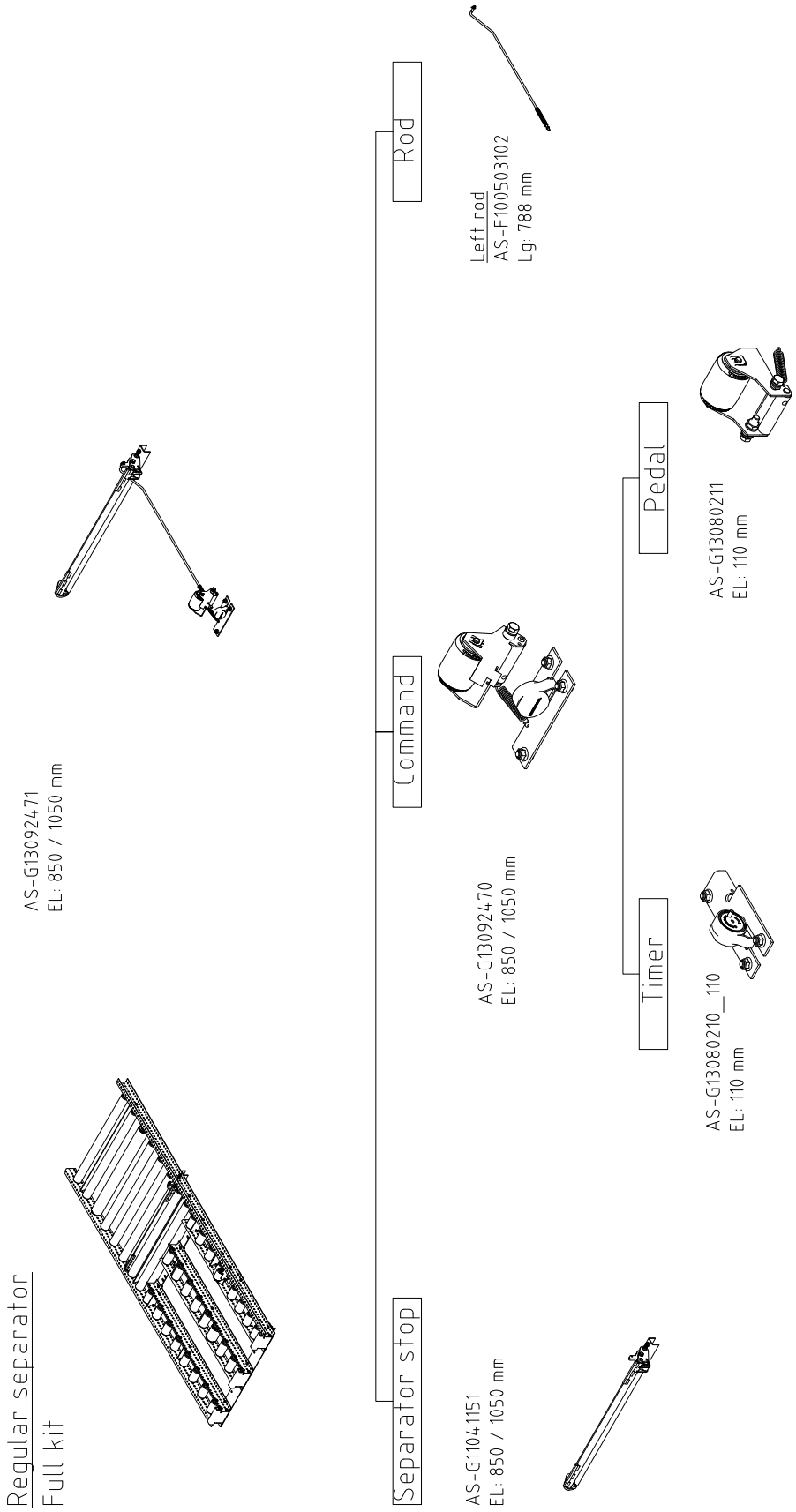


Regular TR separator

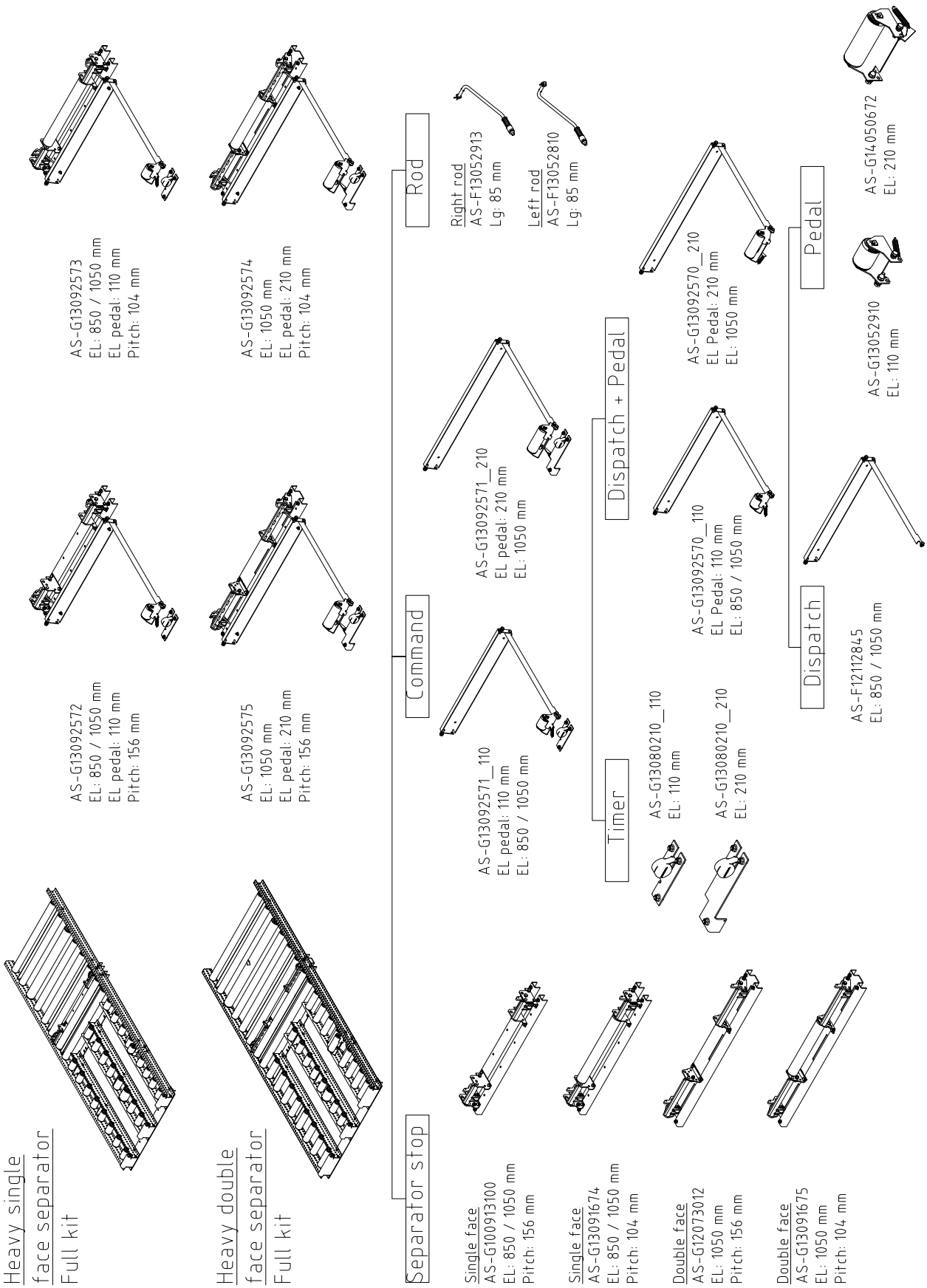


Heavy TR separator

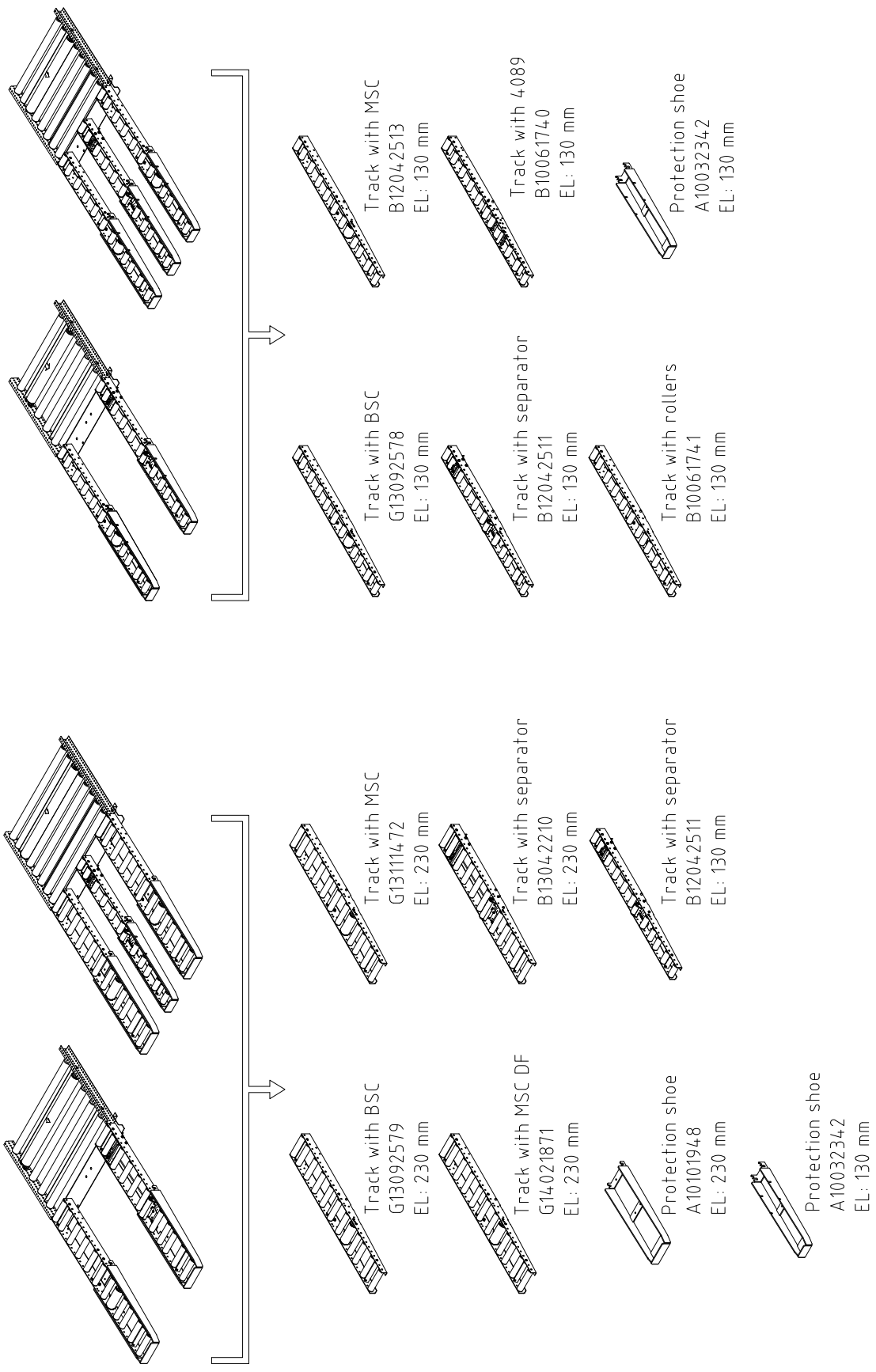
Regular S3R separator



Heavy S3R separator



STP tracks


Track with MSC
B12042513
EL: 130 mm
Track with 4089
B10061740
EL: 130 mm
Protection shoe
A10032342
EL: 130 mm
Track with BSC
G13092578
EL: 130 mm
Track with separator
B12042511
EL: 130 mm
Track with rollers
B10061741
EL: 130 mm
Track with MSC
G13111472
EL: 230 mm
Track with separator
B13042210
EL: 230 mm
Track with separator
B12042511
EL: 130 mm
Track with BSC
G13092579
EL: 230 mm
Track with MSC DF
G14021871
EL: 230 mm
Protection shoe
A10101948
EL: 230 mm
Protection shoe
A10032342
EL: 130 mm

List of spare parts

Before placing your order, have Interroll confirm the reference numbers by providing your order number.

Recommended inventory status:

A = Keep in stock, B = Recommended stock, C = Optional stock

Machine no.

No.	Name	Reference	Quantity	Inventory status
(1)	Pallet guide	AS-F11113070		B
(2)	Loading plate	AS-F04013020		A
(3)	PL cross-tie	AS-F04030221		C
(4)	Rollers	Diam. 60 (1.5 mm thick.) AS-G11041523		A
		Diam. 60 (2 mm thick.) AS-G11041522		A
(5)	Speed control roller	EL: 130 Basic: AS-13091870 Magnetic: AS-G12120710		 A A
		EL: 230 Basic: AS-13091872 Magnetic: AS-G13052972 Magnetic deep freeze: AS-G14042471		 A A
		EL: 850 / 1050 Basic: AS-13052110 Magnetic: AS-G11031452 Magnetic deep freeze: AS-G14011771		 A A
(6)	Regular separator stop	AS-G11041151		A*
	Heavy separator stop	Single front - no rollers: 130/156 AS-G100913100		A
		Single front - no rollers: 104 AS-G13091674		A
		Dual front - no rollers: 130/156 AS-G12073012		A*
		Dual front - no rollers: 104 AS-G13091675		A*

* these components should be replaced exclusively by qualified maintenance personnel, trained and certified by Interroll.

Machine no.				
No.	**Name**	**Reference**	**Quantity**	**Inventory status**
(7)	Regular separator flap	TR module: AS-G13091973		A*
		S3R module: AS-G13092470		A*
	Heavy separator flap	TR module - no rollers: 130/156 AS-G13032510		A*
		TR module - no rollers: 104 AS-G13091373		A*
		S3R module - no rollers: 104/130/156 AS-G13092571		A*
(8)	Lane end stop	TR stop: AS-A06111621		A
		S3R stop: AS-A03101520		A
(9)	Connecting plate	Long: AS-F03100721		C
		Short: AS-F03100722		C

* these components should be replaced exclusively by qualified maintenance personnel, trained and certified by Interroll.

This table provides an indication of requirements for most users. Each user should determine the stock levels required according to their actual usage.

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New Zealand

Interoll reserves the right to modify the technical characteristics of all its products at any time. Technical information, dimensions, data and characteristics are indicative only.

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EN - Translated from French